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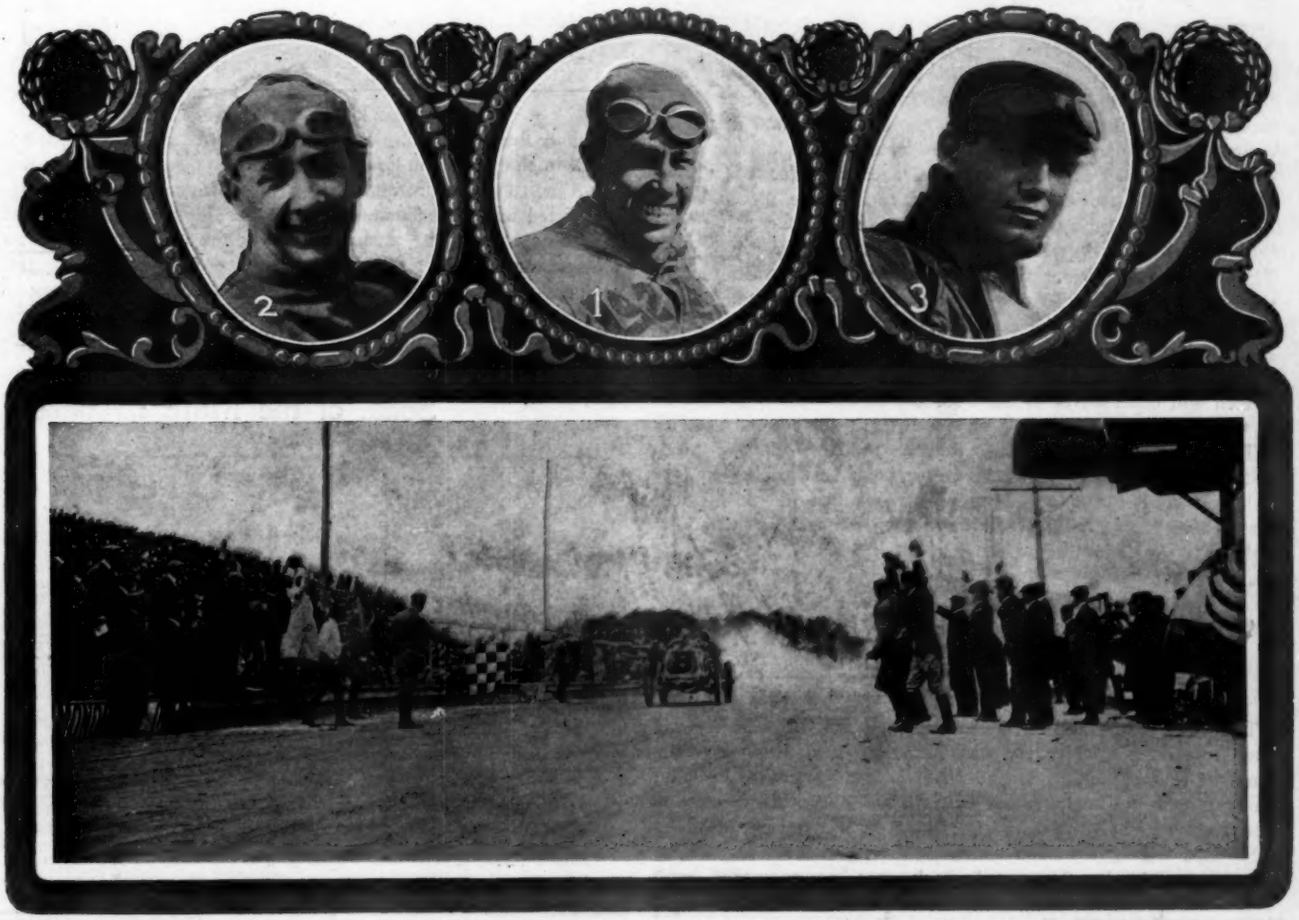
THE AUTOMOBILE

Lozier Smashes Vanderbilt Record

Mercer and E-M-F Win Light Car Races



1—Ralph Mulford, Who Drove the Lozier to Victory in the Vanderbilt. 2—Hughie Hughes, Who Won the Savannah Trophy in the Mercer. 3—Ralph De Palma, Second in the Vanderbilt. 4—Mulford Winning the Vanderbilt Race

SAVANNAH, GA., Nov. 27—Mulford, in a Lozier to-day won the eighth Vanderbilt cup race, over the famous Savannah course. He covered the 291.38 miles at an average pace of 74.07 miles an hour, a pace which makes all former Vanderbilt cup marks look small.

It is 9 miles an hour faster than any previous race for this American classic and is not much below the famous record recently made by the National on the Santa Monica course, namely 202 miles at a speed of 74.628 miles an hour.

When Mulford had covered twelve laps or 205 miles to-day, his average speed was 74.9 miles an hour, or faster than the Santa Monica pace for the same distance. His performance cannot be classed as an intermediate record as he did not announce his intention before the start of the race to go after the record as required by the rules governing official records.

Ralph De Palma, in a Mercedes, was second, being but 2 minutes 11.32 seconds behind the leader, with Wishart in another Mercedes third, and Grant in the second Lozier fourth. Fifth place went to Parker in a Fiat, the only one of three Fiats to finish.

THE WINNERS

VANDERBILT CUP
Lozier—Mulford
291.38 mi.....236:00.67

SAVANNAH TROPHY
Mercer—Hughes
222.82 mi.....195:37.22

TIEDEMAN CUP
E-M-F—Witt
171.4 mi.....176:23.34

Much credit was given to Disbrow, in his Pope-Hummer, that ended in sixth place, although losing much time through the breaking of the exhaust valve and from manifold troubles. Two Abbott-Detroit cars of medium horsepower, were running at the finish. No. 9, driven by Mitchell, having finished sixteen of the seventeen laps, when the race was declared off; and No. 17 having completed fourteen laps. Of the fourteen cars that entered, six finished the race, two others were running at the finish and six dropped out.

A Spectacular Race

THE race was most spectacular from start to finish. It came as the big act of the day's program which consisted of three races, two of which, the Savannah and Tiedeman cup races for smaller cars at shorter distances, were staged early in the day, starting at 8 o'clock. The Vanderbilt was not started until these were completed and it was exactly 11:45 when the starter got the first car away. In spite of this late start Mulford had covered the 291.38 miles at 3:45 o'clock.

The setting was perfect in every respect. The weather was clear, a cloudless sky with a fresh breeze making conditions ideal. The big grandstand, seating over 8,000, was well filled, and there were a couple of thousand more in the bleacher stand across the course. The road surface was prepared to the minute. The entire 17.14 miles of the course had been resurfaced and over $15,000 spent in oiling it. The surface in some places was a little soft but the pace to-day was 4 miles an hour faster than that of the Grand Prize race over the same course last year. The course has several turns but they are all banked and on some of these the cars travelled at as high as 65 miles an hour. On the long stretches the capabilities of the cars constituted the only limit to the speed. The crowds were not all confined to the grandstands, scores of picnicking parties lining the homestretch and other parts of the course that afforded a good view of the racers.

The speed made was higher than anticipated. It was freely stated that the pace would be somewhere between 73 and 74 miles an hour, but few expected it to go over 74. It is much faster than any previous Vanderbilt, the times for which as well as the distances are given herewith:

Year	Distance	Speed
1904	284.3	52.2
1905	283	61.4
1906	297.1	60.8
1907	not held	
1908	258.6	64.3
1909	278.08	62.8
1910	278.08	65.18

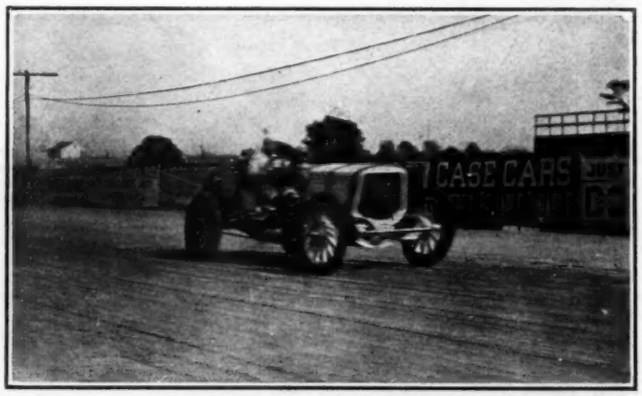
The speed of to-day shows what are the possibilities of medium sized cars on a level course with banked turns. It is generally rumored to-day that the Grand Prize cars of unlimited cylinder capacity will not make much better time over this course on Thanksgiving day.

Perhaps the biggest lesson in to-day's race has been the victory of what might be designated stock cars, as compared with specially designed racing machines. Mulford's car was not strictly stock in that the cylinders were bored out 1-8 inch, making them 5 3-8 by 6 inches bore and stroke. The Rayfield carbureter used was fitted with an adjustment of the needle valve onto the steering column and two extra air inlets mounted on the intake and two exhaust valves. The Lozier pair are chain driven machines and have a pronounced racing appearance due to shrouding the radiator by continuing the hood forward beyond it and curving it in. The three Fiat cars were all racing types having intake

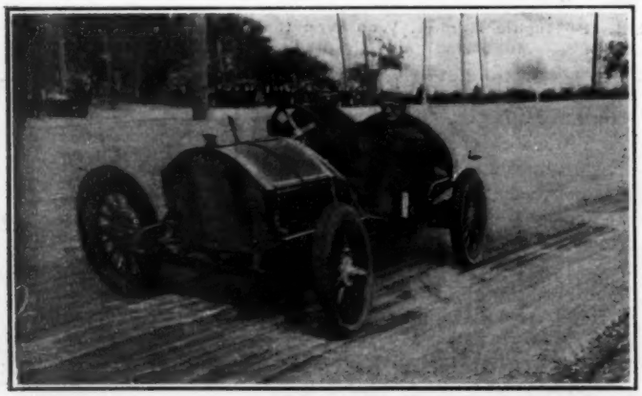
TABLE SHOWING STANDING OF THE CONTESTANTS IN

No.	Car	Driver	Lap Miles	1 17:14	2 34:28	3 51:42	4 68:56	5 85:70	6 102:84
8	LOZIER	Ralph Mulford	E.T.		27:33	41:11	54:56	68:42	82:31
			L.T.	13:48	13:45	13:38	13:45	13:46	13:49
10	MERCEDES	R. De Palma	E.T.		26:47	40:03	53:46	69:25	84:37
			L.T.	13:33	13:14	13:16	13:43	15:39	15:12
4	MERCEDES	Spencer Wishart	E.T.		27:20	40:55	54:55	71:27	85:33
			L.T.	13:44	13:36	13:35	14:00	16:32	14:06
1	LOZIER	Harry Grant	E.T.		31:09	48:45	62:49	76:59	91:06
			L.T.	14:04	17:05	17:36	14:04	14:10	14:07
11	FIAT	E. H. Parker	E.T.		27:59	43:17	59:12	74:11	89:01
			L.T.	13:57	14:02	15:18	15:55	14:59	14:50
3	POPE-HUMMER	L. Disbrow	E.T.		28:56	43:16	61:48	76:02	90:20
			L.T.	14:32	14:24	14:20	18:32	14:14	14:18
9	ABBOTT-DET.	L. A. Mitchell	E.T.		32:46	48:57	65:06	81:17	97:22
			L.T.	16:34	16:12	16:11	16:09	16:11	16:05
7	ABBOTT-DET.	Carl Limberg	E.T.		42:29	59:56	78:21	96:25	107:11
			L.T.	20:22	22:07	17:27	18:25	18:04	20:46
12	MARMON	Cyrus Patchke	E.T.		27:16	40:54	58:07	71:42	88:06
			L.T.	13:41	13:35	13:38	17:13	13:35	16:24
2	MARMON	Bob Burman	E.T.		28:17	42:05	55:56	69:50	83:38
			L.T.	14:17	14:00	13:48	13:51	13:54	13:48
14	FIAT	D. Bruce Brown	E.T.		28:49	42:50	56:49	71:03	85:23
			L.T.	14:34	14:15	14:01	13:59	14:14	14:20
15	FIAT	Joe Matson	E.T.		29:07	43:11	63:23		
			L.T.	13:55	15:12	14:04	20:12		
6	MERCER	Hughes	E.T.		43:05	61:51			
			L.T.	14:32	28:33	18:46			
5	JACKSON	Harry Cobe	E.T.						
			L.T.	16:29					

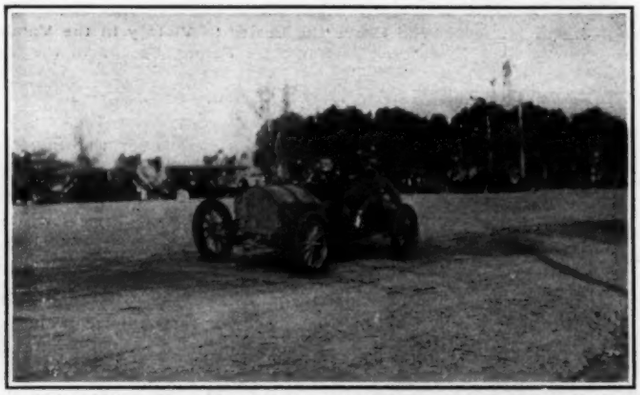
Some of the More Prominent of the



Ralph Mulford, who took Vanderbilt, at the wheel of his Lozier



Hughie Hughes, Savannah winner, speeding on the backstretch



Cyrus Patschke negotiating a sharp turn in his Marmon

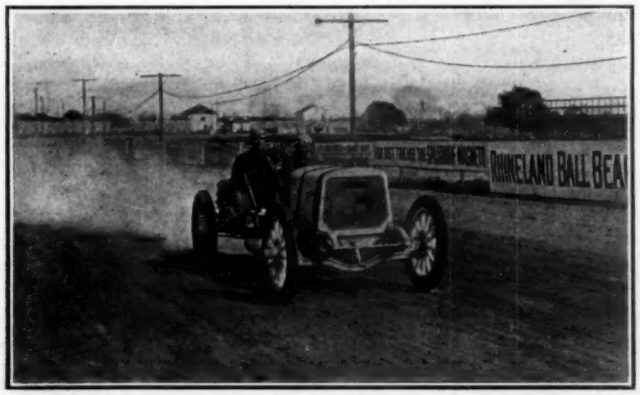
THE VANDERBILT RACE, 17 LAPS, 291.38 MILES

7	8	9	10	11	12	13	14	15	16	17
119:98	137:12	154:26	171:40	188:54	205:68	222:82	239:96	257:10	274:24	291:38
95:56	109:58	123:39	137:24	151:02	164:43	179:43	193:24	208:07	222:19	236:00.67
13:25	14:02	13:47	13:45	13:38	13:41	15:00	13:41	14:43	14:12	13:417
98:10	115:17	129:07	142:49	156:25	170:03	186:30	197:02	210:40	224:26	238:11.95
13:33	17:07	13:50	13:42	13:36	13:38	13:27	13:32	13:38	13:46	13:45
99:35	113:31	127:17	141:03	163:48	177:37	191:16	204:53	218:32	232:22	246:20.37
14:02	13:56	13:46	13:46	22:45	13:49	13:39	13:37	13:39	13:50	13:58
105:13	119:17	133:22	147:36	161:44	175:52	190:20	206:10	220:09	234:12	250:23.57
14:07	14:04	14:05	14:14	14:08	14:08	14:28	15:50	13:59	14:03	16:11
103:49	118:55	133:55	148:51	163:44	178:31	193:06	207:45	224:08	239:35	254:25.88
14:48	15:06	15:00	14:56	14:53	14:47	14:35	14:39	16:26	15:27	14:59
104:38	118:57	133:21	147:47	162:09	178:56	198:00	212:30	227:13	244:30	259:02.68
14:18	14:19	14:24	14:26	14:22	16:47	19:04	14:30	14:43	17:17	14:32
113:24	129:28	145:46	161:54	178:02	196:21	212:29	228:38	244:46	263:00	
16:02	16:04	16:18	15:08	16:08	18:19	16:08	16:09	16:08		
138:04	155:45	173:25	190:57	208:41	226:32	248:34	266:27			
20:53	17:41	17:40	17:32	17:44	17:51	22:02	17:53			
101:29	131:50									
13:23	30:21									
97:28										
13:50										

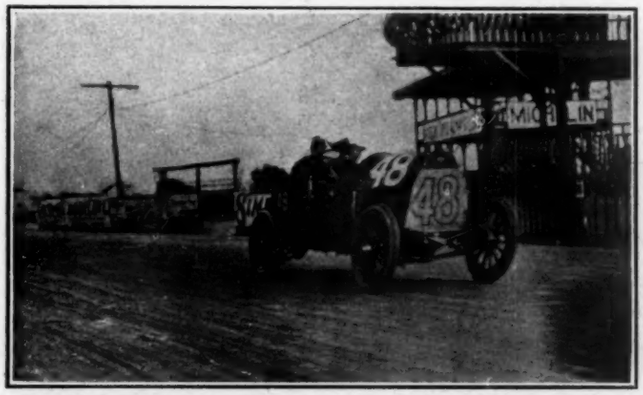
and exhaust valves mounted in the cylinder heads. An overhead camshaft is used and the valves and all actuating parts are entirely enclosed by a metal cover, thus allowing all of the parts to operate in oil. They are chain driven machines and are of the same type as competed in the Grand Prize last year but with reduced bore to bring them under the 600-cubic inch classification.

Savannah lived up to its previous reputations in the manner of conducting the event and patrolling the course. The soldiers were out early and not a person was on the course from start to finish. Military passes were granted to officials and photographers, but otherwise not a person crossed the blackened oiled surface. The scoring was done on two large boards, one serving for each end of the grand stand.

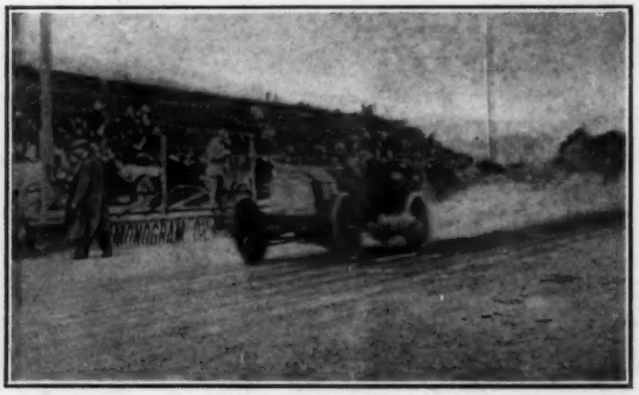
Vanderbilt Contenders in Practice



Harry Grant, the two-time Vanderbilt winner, in his Lozier



Bruce-Brown in the Fiat doing 75 miles an hour in practice



Parker in his Fiat did exceptionally fast work in practice

Vanderbilt Lap by Lap

Vanderbilt Cup

LAP 1—It was a whirlwind start, six of the fourteen starters setting out to do the distance under the 14-minute mark and they did it. Ralph De Palma, the favorite before the start, set the pace with a lap in 13:33 or 76.5 miles an hour and Patschke in a Marmon was close by in 13:41, with Wishart in another Mercedes, Mulford, Lozier, and Matson, Fiat, close behind.

It was a magnificent opening spectacle. Everybody wondered what the time would be, and when the opening lap was so favorable, everyone looked to the establishing of some new road race marks.

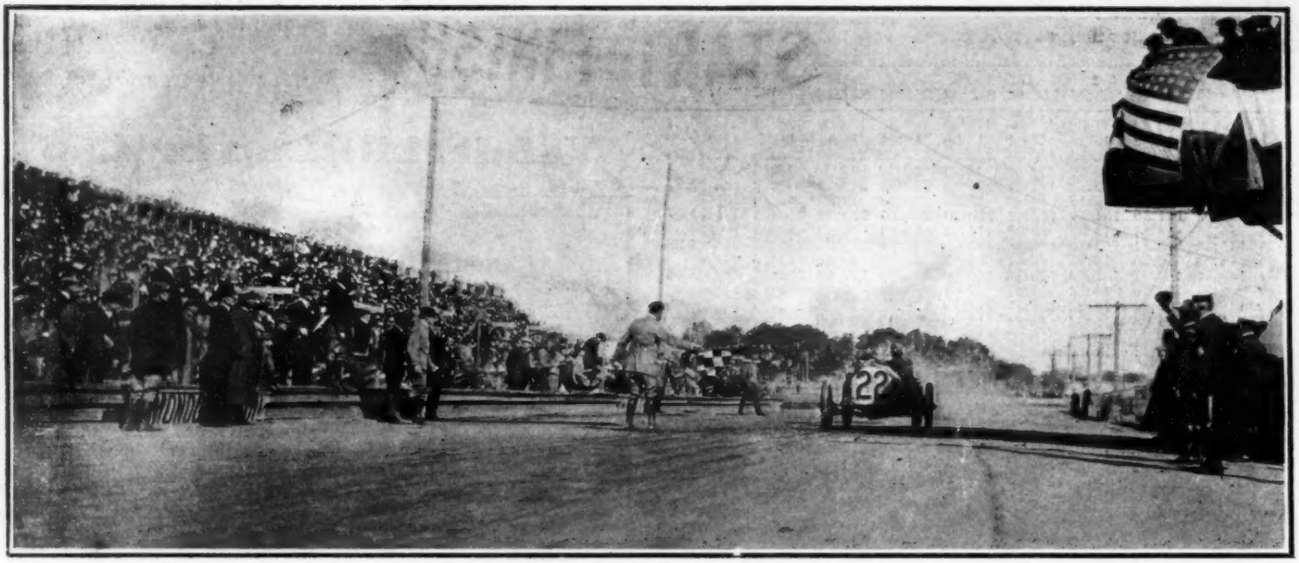
Starter Wagner got them away at 30-second intervals and it was a long 7-minute wait from the time Matson left the tape until the megaphone announced car coming. Down the stretch a white meteor flashed toward the big grandstand turn and Grant in No. 1 Lozier, first away, was first to cross the tape. Behind him came Burman in his yellow Marmon, a literal streak, as it flew down the black polished roadway.

Scarcely had Burman passed the judges' stand than the sombre gray Mercedes No. 4, Wishart, took the curve in arrow-like fashion and was gone. Disbrow, in the Pope-Hummer, was not 200 yards back of him. Then came a wait, seconds seemed minutes and minutes, hours. Eyes were strained into the bushes on the stretch where the black ribbon of road emerged from the foliage. A wait and then a yellow flash, Patschke in his Marmon, came and went. Another glance saw Mulford in his white Lozier, and with white uniform, chase Disbrow.

These five were ahead of the rest of the field. Then followed a wait. Everyone was anxious. Presently, the gray Mercedes, No. 10, of De Palma shot into the curve and was gone. Behind him came No. 9, Jackson, the only time the grandstand was to get a sight of it. It withdrew in the second lap.

Everybody looked for some of the red Fiats, they all started late, their numbers being 11, 14 and 15. Parker in 11 came first. A blue Abbott was next, No. 9, driven by Mitchell, and then came 15 and 14, Matson, driving 15, having passed his team mate on the opening lap. With all past the grandstand the crowd settled down to watch the scoreboards and see how the struggle progressed.

Lap 2—This was a Mercedes lap with De Palma first, Wishart third and Patschke's Marmon sandwiched between. Mulford



Hughes in the Mercer, No. 22, flashing across the tape on the final lap of the Savannah Trophy race

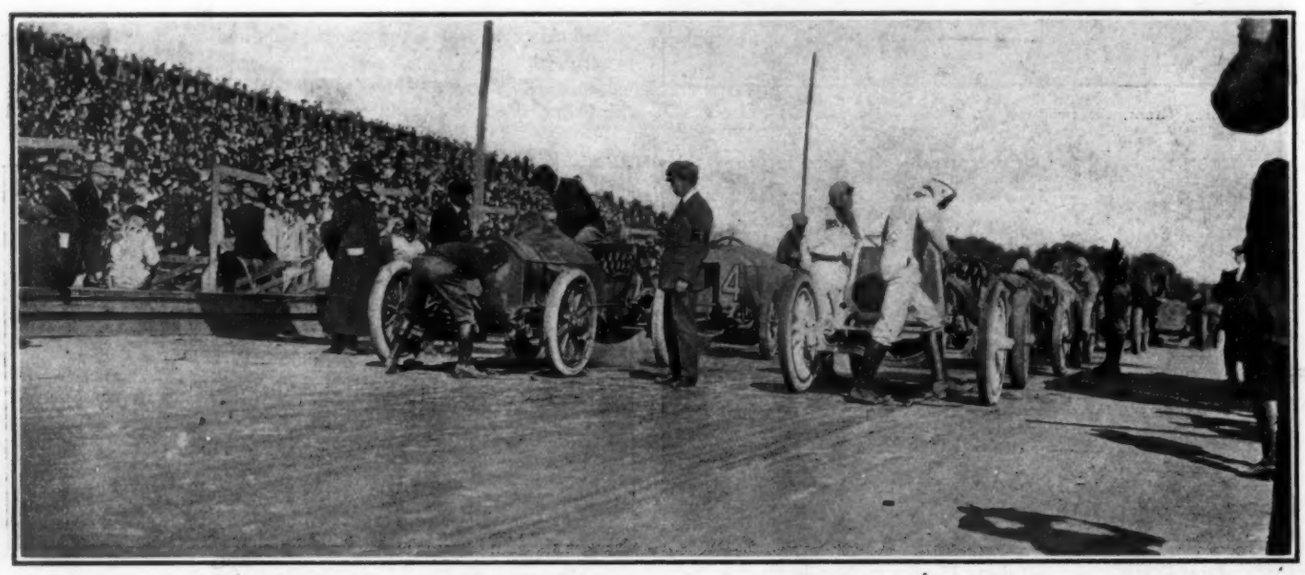
was running in fourth place. This was a bad lap for Grant, who lost a tire and dropped to tenth place. De Palma did the circuit in 13:14, which proved to be the fastest circuit of the race, a pace of 78 miles per hour. Mulford put himself in fourth place in the opening lap and held it. Parker's Fiat, No. 11, was but 26 seconds back of him. These five, Mercedes, Marmon, Mercedes, Lozier and Fiat, were already in a bunch by themselves in the lead. Back of them came another group made up of Burman in Marmon, Brown in Fiat and Hughes in Mercer. Grant, in Lozier, was already (due to tire trouble) 5 1-2 minutes behind De Palma and back of him came the Abbotts. At this time there were 16 minutes between the first and last car with one car out, No. 5 Jackson.

Lap 3—This lap saw the first big shuffling up and changing of positions among the speed kings. The first four leaders remained unchanged, namely Mercedes, Marmon, Mercedes and Lozier, but here it ended. Burman pushed No. 2 Marmon to the front and took fifth place and Parker's Fiat dropped from fifth to ninth. No. 15, Matson's Fiat, stopped to take on water due to a leaky connection and so dropped to seventh place. Disbrow established himself in eighth position with Parker and Grant below him. The two Abbotts were next, with Hughes in Mercer, last. No cars dropped out, but the Mercer had magneto trouble that brought about its withdrawal in the next circuit. Mulford tore the tread off his left rear tire, but did not change it before the end of the twelfth lap.

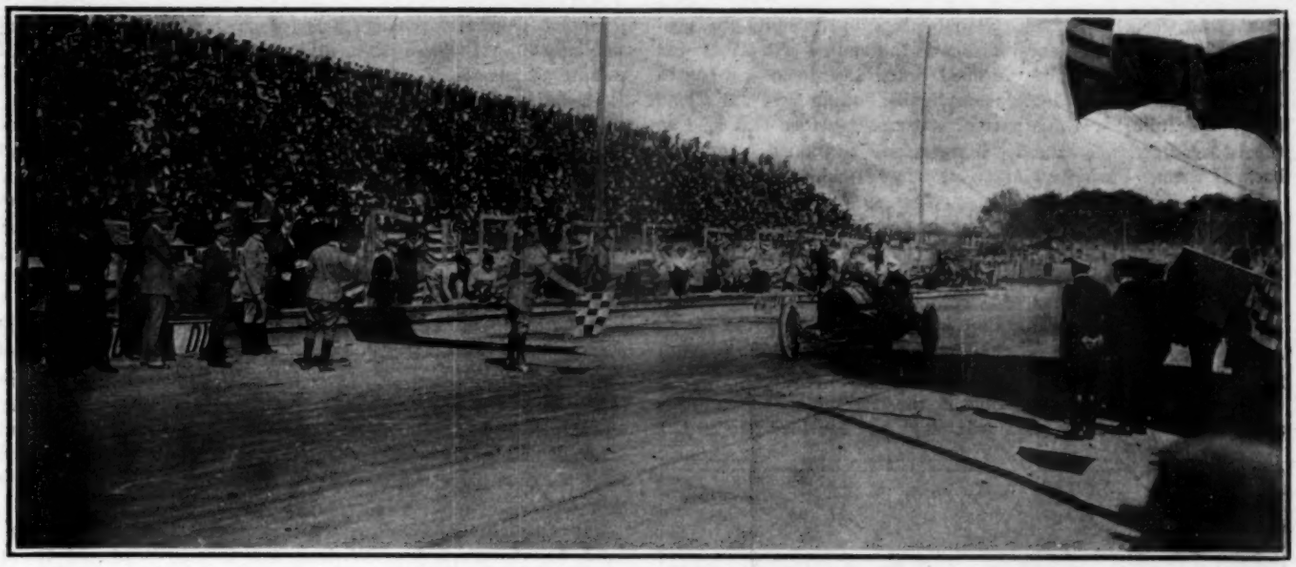
Lap 4—The cars were stringing out in this lap. It was a foreign lap with Mercedes first and second, De Palma in the lead and Wishart second, having nosed Patschke's Marmon out, which dropped to sixth position. Mulford had gained third place and was only one second behind Wishart, the figures being Wishart 54:55 and Mulford 54:56. But De Palma had the other Mercedes 1 minute 11 seconds in the lead.

Lap 5—This lap was epoch-making in the race, as it saw the dislodgement of the European representatives and the American car forged to the front, Mulford's Lozier taking De Palma's place as leader. But it was still worse for the Mercedes people as Wishart stopped for a tire change and lost 2 minutes, the new rim not fitting and the axle slipping off the jack. This dropped him from second to fifth place and moved up Burman and Brown. Below this the order of affairs remained the same, excepting that 15, Fiat, dropped out with leaky water connections. There were three cars out with but five laps covered. At this time Grant and Disbrow were having a pretty duel; they passed the grandstand not a length apart on the fourth lap.

Lap 6—Changes came in this lap. Mulford's Lozier held first



The fourteen contenders for Vanderbilt Cup honors as they were lined up for the start



Frank Witt, in E-M-F, No. 35, finishing first in the contest for the Tiedeman Trophy

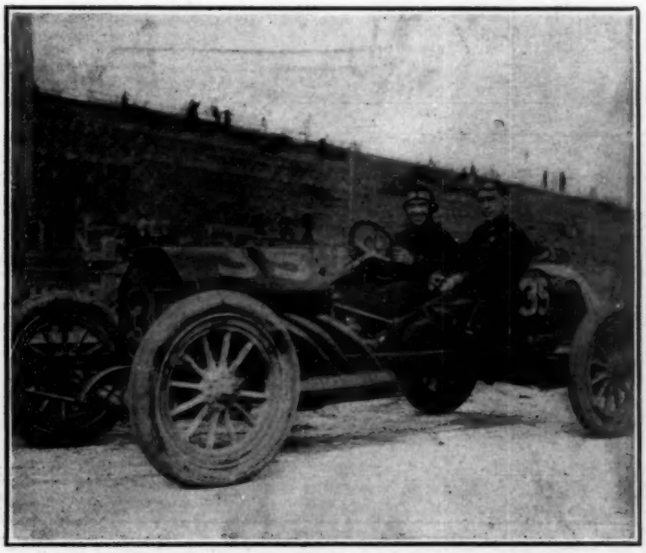
place but De Palma dropped from second position to third. Burman by fast driving having supplanted him with a margin of almost 1 minute, while Mulford had in turn a lead of 1 minute on him. In fact, each of the four leaders, Mulford, Burman, De Palma and Brown, were 1 minute apart. Wishart was fifth and 3 minutes behind the first group. Grant and Disbrow were still together, the latter leading by 46 seconds. They were both 8 minutes back of the leaders. One Abbott was 7 minutes back of them and the other 27 minutes back. As Bruce-Brown passed in his Fiat it was known that the rear axle was badly sprung, the wheel toeing out. The referee had issued instructions to stop him on the following lap, but this was unnecessary for he lost the left rear wheel on a turn and was out in the following lap.

Lap 7—This was not an eventful lap. Bruce Brown, in the Fiat, dropped out when in fourth place, and so moved those below him up, putting Wishart's Mercedes fourth, Patschke's Marmon fifth and Parker's Fiat sixth. Disbrow was seventh, Grant eighth and Abbotts ninth and last. Matson's Fiat went out when a trunnion broke on its radiator.

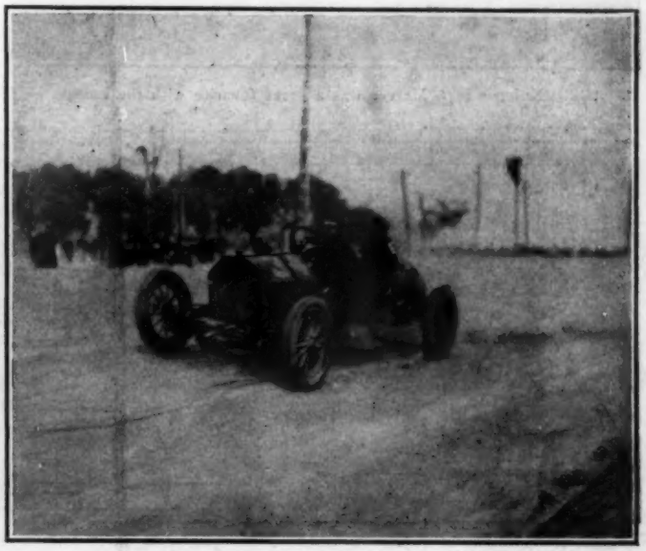
Lap 8—This lap was disastrous to the American field in that Burman's Marmon, which he had put in second place and was only 1 minute and 7 seconds back of Mulford, went out with magneto trouble. Wishart took his Mercedes from fourth into second place, with De Palma in third, Parker fourth, Disbrow fifth and Grand sixth. Patschke dropped from fifth to eighth and went out in the following lap, the report being engine trouble. The contest was now resolving itself into a Lozier-Mercedes duel just as the Savannah race a few hours before became a Mercer-Marmon duel. Grant was well up in his climb from tenth place, being now in sixth, and, as after events showed, continued this upward march until in third position.

Lap 9—This lap brought more American disasters, though not unexpectedly, as Patschke was declared out, with a disabled water pump, leaving Mulford and Grant to uphold the American end of the race against the two Mercedes and Parker's Fiat. By this time the race had settled down to a definite performance. The race was half over and there was little change in the order, which was Mulford, Wishart, De Palma, Disbrow, Grant, Parker and the two Abbotts. Disbrow and Grant had passed up, lowering Parker from fourth to sixth place. Six of the fourteen cars that started were out. There was an interval of 50 minutes between the leading Lozier and No. 7 Abbott. Both of the Abbotts were much lower powered than the other cars, but they showed remarkable regularity, No. 9 doing particularly notable work.

Lap 10—There was only one change in this lap, this being



Frank Witt, in the E-M-F, which won the Tiedeman Trophy



E-M-F, driven by Evans, which finished second in the Tiedeman

Grant's Lozier climbing into fourth place and pushing the Disbrow Pope into fifth place. This was the end of a duel between these two cars that had continued practically from the fourth lap. At this point Grant was gradually pulling away, his lead being 11 seconds. At this part of the race Mulford was leading the two Mercedes by 4 and 5 minutes and Grant was 5 minutes back of them. Parker's Fiat was 2 minutes behind Grant.

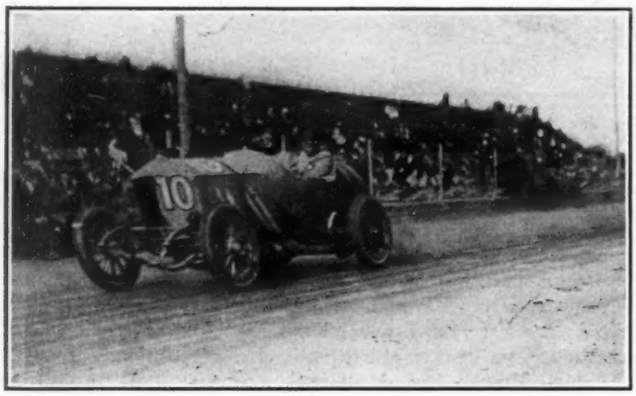
Lap 11—This lap saw Wishart's Mercedes drop from second to sixth place, putting De Palma in second, Grant third, Disbrow fourth and Parker fifth. Disbrow had his trouble in the back stretch and he was 22.45 on the circuit, one of the slowest any of the leaders finished. De Palma made the lap in 13:42 and Mulford in 13:45, both running very closely together. No. 9 Abbott was maintaining its pace by going the circuit in 15:08, a pace of 68 miles an hour.

Laps 12 and 13—Not a change in the position of the contestants occurred in these laps. In lap 12 Mulford stopped 1 minute 6 seconds to change a left rear shoe and took on gasoline and oil. Disbrow stopped to change a left rear, losing 1 minute 35 seconds.

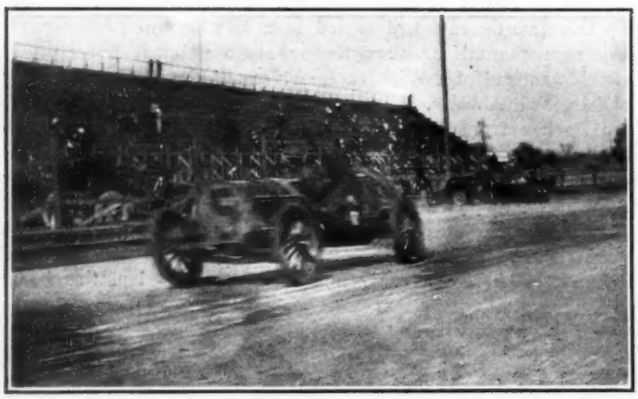
Wishart was traveling fast in these laps and was rapidly cutting down the lead that Grant, in third place, had on him. De Palma was also traveling very fast and, due to Mulford having to stop, had cut his 5-minute lead to about 2 minutes. This marked part of the grand struggle on the part of both De Palma and Wishart to dislodge the leading Lozier. Before stopping at its pit the Lozier had 5 minutes on De Palma, 13 minutes on Wishart, 14 minutes on Parker's Fiat and 13 on Disbrow.

The finish laps, 14, 15, 16 and 17, can properly be considered together because in lap 14 Wishart nosed Grant out of third place and from that to the end there was not a change in the positions of the eight cars that were running. This order was Mulford, De Palma, Wishart, Grant, Parker, Disbrow and Mitchell and Limberg in Abbotts. As told in another place, the fight for first place was between De Palma and Mulford in the four laps.

But with only a couple of laps to go the handicap was too much for the Mercedes. Wishart was firm in third and Grant safe in fourth, having 4 minutes' lead on Parker, who was fifth. Six cars finished the entire seventeen laps and the two Abbotts were running at the finish. No. 9 finished sixteen laps and No. 7 finished fourteen. Six cars dropped out of the race.



Ralph DePalma in the Mercedes finished second in the Vanderbilt



Billy Knipper in a Mercer was a great favorite with the crowds

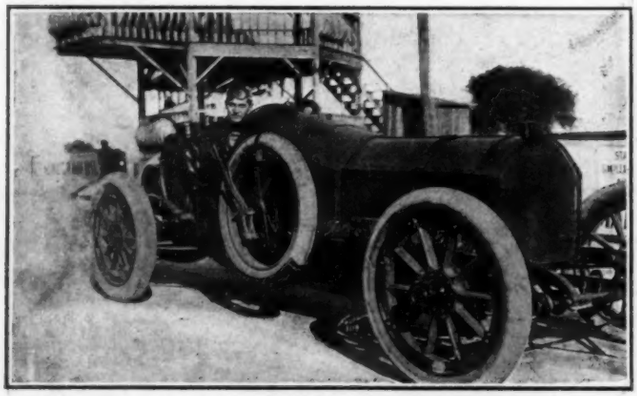
Story the Pits Told

THE elimination story is never a pleasant one in connection with a road race and in this respect, to-day's race exacted a heavy toll in six cars being eliminated. The causes of all of the eliminations have not been learned to date. The majority of the troubles were due to vibration. Burman, in his Marmon, had magneto trouble; Matson's Fiat broke a radiator trunnion. Brown's Fiat bent the rear axle and then lost a rear wheel; the Mercer suffered magneto troubles. No report was had on the Jackson. Patschke's Marmon had reported motor trouble without specifying any details.

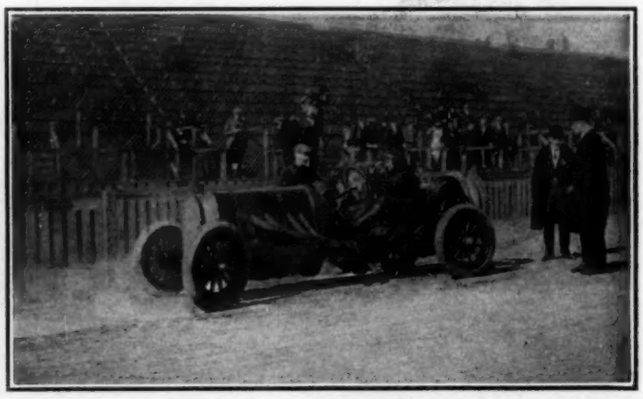
Thirteen stops were made at the grandstand pits for repair,

TABLE SHOWING POSITION OF EACH CAR IN THE

No.	Car and driver.	1st	2d	3d
8	Lozier, Mulford	4	4	4
10	Mercedes, De Palma	1	1	1
4	Mercedes, Wishart	3	3	3
1	Lozier, Grant	7	10	10
11	Fiat, Parker	6	5	9
3	Pope-Hummer, Disbrow	9	8	8
9	Abbott-Detroit, Mitchell	13	11	11
7	Abbott-Detroit, Limberg	14	12	12
12	Marmon, Patchke	2	2	2
2	Marmon, Burman	8	6	5
14	Fiat, Bruce-Brown	11	7	6
15	Fiat, Matson	5	9	7
6	Mercer, Hughes	10	13	13
5	Jackson, Cobe	12		



Cy Patschke in his Vanderbilt and Grand Prize Marmon



Louis Disbrow ready to try out his Pope-Hummer

replacements and supplies during the running of the Vanderbilt cup race to-day. They were as follows: No. 15, Matson's Fiat, lap 2, water, time 1 minute; No. 4, Wishart's Mercedes, gasoline and tire, time 2:10; No. 11, Parker's Fiat, lap 4, tire, time 1:26; No. 15, Matson's Fiat, water and tires; No. 10, DePalma Mercedes, lap 5, water, gasoline and oil and tires; No. 7, Abbott, lap 6, gasoline and oil and adjusting carbureter air valve; No. 12, Patschke's Marmon, water and gasoline and rear tire, time 1:21; No. 8, Mulford's Lozier, lap 12, tire and gasoline and oil, time 1:04; No. 3, Disbrow's Pope, gasoline, oil and left tire, lap 11, time 1:20; No. 9, Abbott, lap 11, gasoline, water and oil, time 1:37. No. 1, Grant's Lozier, lap 12, tire, gasoline and oil; No. 1, lap 15, tire, time 26 seconds; No. 7, Abbott, lap 11, oil and water and oil line broken and carbureter air valve broken.

These do not represent all of the stops, however, as there was a tire control on the back stretch and many cars stopped there to take on and put off tires as well as to make changes. At this extra tire control the driver and mechanic were compelled to do all of the work in a tire change.

FASTEST LAPS MADE BY CARS IN THE VANDERBILT RACE

No.	Fastest Car	Lap	Time	Lap	Time	Lap	Time	Lap	Time	M.P.H.
8	Lozier	7	13.25	3	13.38	11	13.38	12	13.41	77.8
10	Mercedes	2	13.14	3	13.16	13	13.27	7	13.33	78.4
4	Mercedes	3	13.35	2	13.36	14	13.37	13	13.39	77.2
1	Lozier	15	13.59	16	14.03	4	14.04	8	14.04	75.7
11	Fiat	2	14.02	13	14.35	14	14.39	12	14.47	73.4
3	Pope-Hummer	5	14.14	6	14.18	7	14.18	8	14.19	72.8
9	Abbott-Detroit	10	15.08	7	16.02	8	16.04	6	16.05	68.2
7	Abbott-Detroit	3	17.27	10	17.32	9	17.40	10	17.41	59.6
12	Marmon	7	13.23	2	13.25	5	13.35	5	13.38	77.6
2	Marmon	3	13.48	6	13.48	7	13.50	4	13.51	76.4
14	Fiat	4	13.59	3	14.01	5	14.14	2	14.15	76.0
15	Fiat	1	13.15	3	14.04	2	15.12	4	20.12	78.3
6	Mercer	1	14.32							72.0
5	Jackson	1	16.29							63.1

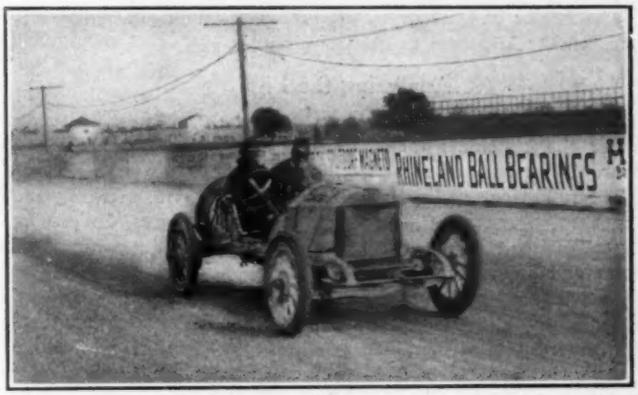
Lozier-Mercedes Duel

THE duel from start to finish between Ralph Mulford and Ralph DePalma was one that will long live in the minds of those who watched the changing conditions. In a word, De Palma took the lead in the race for the first four laps and then Mulford took it for the remaining thirteen.

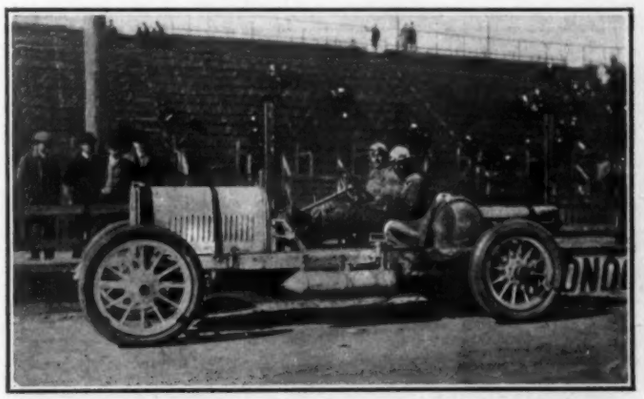
De Palma led Mulford by 1:10 at the end of the fourth lap which was changed to a Lozier lead of 53 seconds at the end of lap five, De Palma having to change tires on the course and stop at grandstand pits for 2 minutes while tires were put in the rack and oil and water taken on, the result being that Mulford had a lead of 2:06 at the end of lap six. He increased it to 2:14 in lap seven and at the end of lap eight, with the race practically half over, Lozier had a lead of 5:19 and lap nine saw the Lozier's lead increased to 5:29; this was the greatest margin that separated the two cars at any point in the contest. De Palma cut 4 seconds in lap ten and lap eleven saw 2 more seconds cut off. It was a gallant chase that De Palma was putting up and an equally gallant race that Mulford was giving him. Three more seconds were cut off in lap twelve so that at the end of this circuit Mulford had a lead of 5:20. It was at the end of this lap that Mulford slowed down to change a left rear tire and take on gasoline and oil, losing, all told, 1:06. He lost more because the Savannah people were anxious to have him cross the tape so that his time for the distance might be taken. At

VANDERBILT RACE AT THE END OF EACH LAP

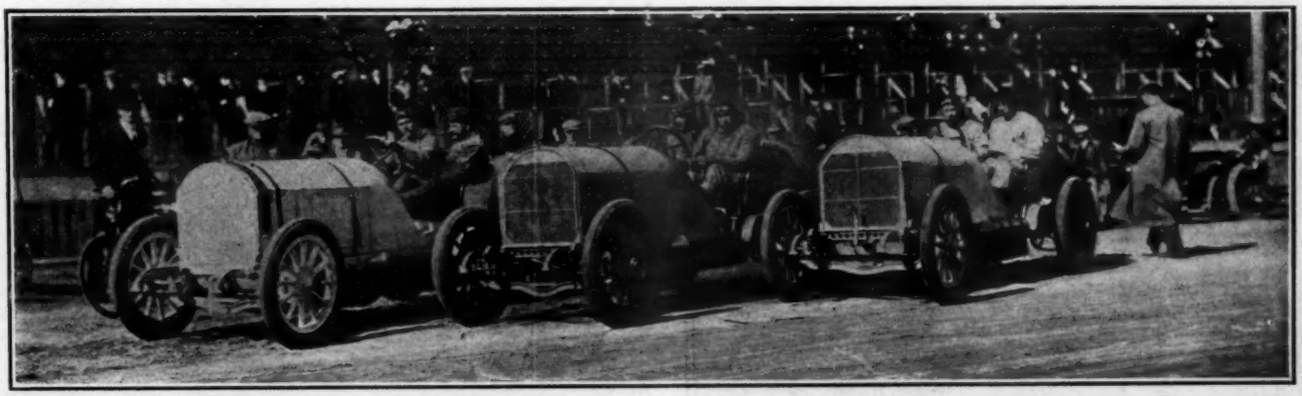
4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
3	1	1	1	1	1	1	1	1	1	1	1	1	1
1	2	3	3	3	3	3	2	2	2	2	2	2	2
2	5	5	4	2	2	2	6	4	4	3	3	3	3
9	9	9	8	6	5	4	3	3	3	4	4	4	4
7	7	7	6	4	6	6	5	5	5	5	5	5	5
8	8	8	7	5	4	5	4	6	6	6	6	6	6
11	10	10	9	7	7	7	7	7	7	7	7	7	
12	11	11	10	9	8	8	8	8	8	8			
6	6	6	5	8									
4	3	2	2										
5	4	4											
10													



Louis Disbrow giving the word for a time trial of his Case car



Harry Grant poses for the staff photographer before a tryout



The Grand Prize Benz team, composed of Hemery, Bergdoll and Hearne, made a great impression

this point he had covered 205 miles and the crowds wanted to know if he had beaten the speed at the recent Santa Monica race which was at a distance of 202 miles.

At the end of lap thirteen Mulford had a lead of but 3:47 on the Mercedes, which was being pushed hard, De Palma doing the lap in 13:27, which proved to be his third fastest in the race.

At the end of lap fourteen the lead of 3:47 was cut to 3:38. Excitement was intense at the end of lap fifteen when Mulford had to stop to put a tire on the rack, which cost him 10 seconds. Taking on a tire meant that he had made a change on the course and he had a lead of but 2:33 with two laps to go.

In spite of changing a tire on the course and stopping at the pit he made the lap in 14:43. Lap sixteen and seventeen were anguishing processions. Everybody wondered, if the Lozier would have to change another tire and, if so, the Mercedes would almost overtake it. At the end of lap sixteen there was 2:07 between the speed monsters, at which time both were given the green flag by the starter, meaning one more lap to go.

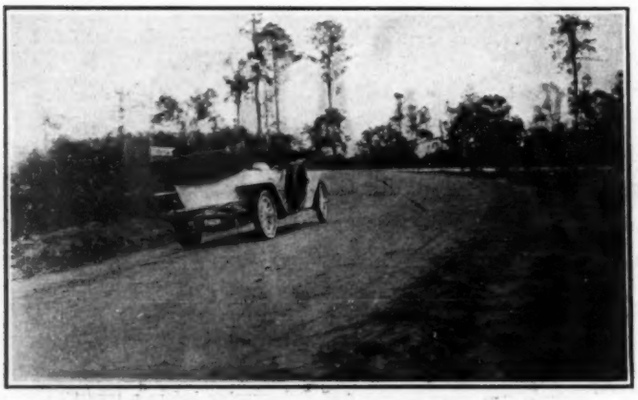
The Lozier had a margin of 2.11:28, it having gained 4 seconds on the Mercedes in the last circuit.

Analyzing the Figures

The Mercedes made fourteen of the seventeen circuits under the 14-minute mark, which means over 73.5 miles per hour. The record of 13:14 is 78 miles an hour.

The following are De Palma's laps: 13:14, 13:16, 13:27, 13:32; 13:33, 13.33, 13:36, 13:38, 13:38, 13:42, 13:43, 13:45, 13:46 and 13.50. He had three slow laps, namely; 5, 6 and 7 in 15:39, 15:12 and 17:07 seconds.

As compared with this the winning Lozier made thirteen laps under the 14-minute mark, the fastest being the seventh in 13:25. Mulford showed remarkable regularity by doing four laps in 13:41 each and three in 13:45 each and two in 13:38 each. This goes to recall the steady pace held by Mulford during last year's Vanderbilt Cup race.



The Dowelle turn has been skillfully banked and made safe

One of the worst turns on the course—at Roche and Dale avenue

TABLE SHOWING STANDING OF THE CONTESTANTS IN THE

No.	Car	Driver	Lap Distance	1 17:14	2 34:28	3 51:42	4 68:56
22	MERCER	H. Hughes	Elap. T.		30:19	45:23	60:16
			Lap. T.	15:18	15:01	15:04	18:53
21	MARMON	Heineman	Elap. T.		31:29	46:41	61:54
			Lap T.	15:57	15:32	15:12	15:13
25	MARMON	J. Nikrent	Elap. T.		31:58	47:33	63:10
			Lap T.	16:21	15:37	15:35	15:37
24	MERCER	W. F. Barnes, Jr.	Elap. T.		30:17	45:07	60:24
			Lap T.	15:22	14:55	14:50	15:17
23	CASE	Buckley	Elap T.		39:42	58:38	77:23
			LapT	19:53	19:49	18:56	18:45
27	MERCER	B. Knipper	Elap T.		30:28	45:41	60:49
			Lap T.	15:19	15:09	15:13	15:08
26	CASE	Disbrow	Elap. T.		29:38	44:16	59:23
			Lap T.	14:56	14:42	14:48	14:53

Mercer Wins Savannah

Savannah Trophy

THE race for the Savannah trophy was started this morning at 8 o'clock and was for a distance of 222.82 miles, or thirteen laps of the circuit. Seven cars started, three Mercers, two Marmons and two Case specials. Hugh Hughes, driving 22 Mercer, won, going the 222.82 miles in 195 minutes and 37 seconds, or 68.04 miles per hour. Heineman, driving a Marmon, was second, being 4 minutes behind the Mercer, and third place was won by Nikrent in another Marmon.

This race was a Mercer-Marmon duel from the fifth lap to the end. Up to the fifth lap, Disbrow driving a Case Special led with Mercer second and Marmon third. Disbrow withdrew in the fifth lap owing to motor trouble and this put the Hughes Mercer into the lead which position it maintained until the end.

The Mercer-Marmon duel was interesting from start to finish. It was not a case of one Marmon contesting against one Mercer, but the three Mercers were waging was against the two Marmons with varying success, although Hughes was never headed off.

TABLE SHOWING STANDING OF CONTESTANTS IN THE RACE

No.	Car.	Driver.	Lap Distance.	1 17.14	2 34.28
35	E. M. F.	Frank Witt	Elap. T.		35:46
			Lap T.	18:03	17:43
34	E. M. F.	R. Evans	Elap. T.		36:53
			Lap T.	18:41	18:12
33	E. M. F.	Jack Tower	Elap. T.		37:45
			Lap T.	19:23	18:22
36	FORD	Frank Kulick	Elap. T.		37:10
			Lap T.	20:13	18:57
31	ABBOTT-DETROIT	M. Roberts	Elap. T.		32:47
			Lap T.	16:23	16:24
32	ABBOTT-DETROIT	R. L. Hartman	Elap. T.		
			Lap T.	18:04	

The ironing of the course continued between times all last week

SAVANNAH CHALLENGE TROPHY, 13 LAPS, 222.82 MILES.

5 85:70	6 102:84	7 119:98	8 137:12	9 154:26	10 171:40	11 188:54	12 205:68	13 222:82
75:07	89:54	104:43	119:36	135:11	150:22	165:20	180:23	195:37.22
14:51	14:47	14:49	14:53	15:35	15:11	18:58	15:03	15:14
77:06	92:21	107:35	122:49	138:07	153:29	170:41	186:19	201:41.49
15:12	15:15	15:14	15:14	15:18	15:22	17:12	15:38	15:22
78:42	94:08	109:37	125:07	140:50	156:38	172:27	188:35	204:42.93
15:32	15:26	15:29	15:30	15:43	15:48	15:49	16:08	16:07
75:45	93:56	109:56	124:07	139:31	155:02	170:35	186:13	
15:21	18:11	16:00	14:11	15:24	15:31	15:33		
96:02	130:03	148:53	167:51	188:26	207:45			
18:39	34:01	18:50	18:58	20:35	19:19			
75:58	91:01	106:07	133:44					
15:09	15:03	15:06	27:37					

E-M-F Wins Tiedeman

This race was started at 8 o'clock this morning with the ground white with frost which made it cold during the first few laps. Disbrow started out to burn up the course and would have without doubt been an easy winner had his car held up. He made his first lap 22 seconds faster than his nearest competitor; at the end of lap two he had a 49-second lead over Barnes, in a Mercer; in the third lap his lead was 51 seconds and in the fourth it was 54 seconds ahead of Hughes. Once the Case was out, the race was taken in hand by Hughes, who led to the finish.

Tiedeman Trophy

While the Case was leading, the Mercers were running second and third with Marmon fourth, and in lap five it was Mercer one, two and three, the drivers being Hughes, Barnes and Knipper. Lap six saw Knipper move to second place and Heineman in No. 21, Marmon, annex third position. Lap seven saw more Marmon gains in that Nikrent driving Marmon 25, passed Barnes. In lap eight it was Mercer, Marmon, Mercer, Marmon, Mercer. Lap nine saw the same order of running continue and Knipper's Mercer was taken out, the trouble not being known. In lap ten the order remained unchanged. Lap eleven saw the Barnes Mercer take second place away from Heineman's Marmon, holding the place in lap twelve, but losing it in lap thirteen, the last of the race, so that when it was over the order was Mercer, Marmon, Marmon, the Barnes Mercer not showing up at the end of the race.

The fastest lap in the race was made by the Barnes Mercer in the eighth circuit in 14:11 or over 70 miles per hour. The winning Mercer made one stop, in lap nine, to take on gasoline and oil and repair a hinge in the bonnet. Heineman stopped for 10 seconds in lap twenty-one to take on a tire to replace one changed on the backstretch.

FOR THE TIEDEMAN TROPHY, 10 LAPS, 171.40 MILES.

3 51.42	4 68.56	5 85.70	6 102.84	7 119.98	8 137.12	9 154.26	10 171.40
54:02	71:46	89:15	106:45	124:07	141:24	158:48	176:23.34
18:16	17:44	17:29	17:30	17:22	17:17	17:20	17:35
54:48	72:33	90:16	108:01	125:46	144:37	162:25	180:12.34
17:53	17:45	17:43	17:45	17:45	18:51	17:48	17:47
56:01	74:19	92:33	110:23	128:16	146:03	163:46	181:33.84
18:16	18:18	18:14	17:50	17:53	17:47	17:43	17:47
58:47	83:18	100:54	119:55	139:25	157:31	180:36	201:07.50
19:07	25:01	17:36	19:01	19:30	18:06	23:05	
49:17	65:49	82:29	99:16				
16:30	16:32	16:40	16:47				

E-M-F One-Two-Three in Tiedeman

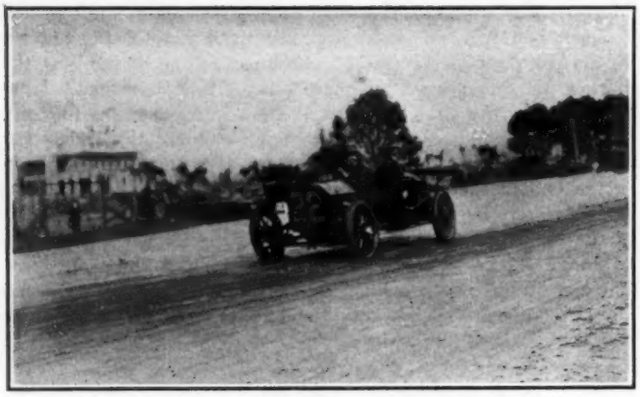
To-day's race for the Tiedeman trophy, ten laps, 171.40 miles, was won by E-M-F machines that finished one, two and three, the only other car running at the finish being the Ford (Kulick). Two Abbott-Detroits were entered, but No. 32 went out in the second lap with a cracked cylinder and No. 31 in the seventh with a broken valve rocker arm. There were six starters and the race was started immediately after the Savannah cup, the first car in the Tiedeman starting 30 seconds after the last of the Savannah.

The three E-M-F cars made a remarkable showing, all finishing within a 3-minute zone. The winner, No. 35, driven by Frank Witt, made the 171.40 miles in 176 minutes and 19 seconds. No 34, driven by Robert Evans, was second in 180 minutes 12 seconds and No. 33 third, in 181 minutes 33 seconds. Kulick, in the Ford, covered the distance in 201 minutes 7 seconds. The fastest lap in the race was made by Mortimer Roberts, in No. 31 Abbott, being 16.23 or 63 miles per hour. When Roberts dropped out in the seventh lap he was 7 minutes in the lead, with the three E-M-F's in second, third and fourth place.

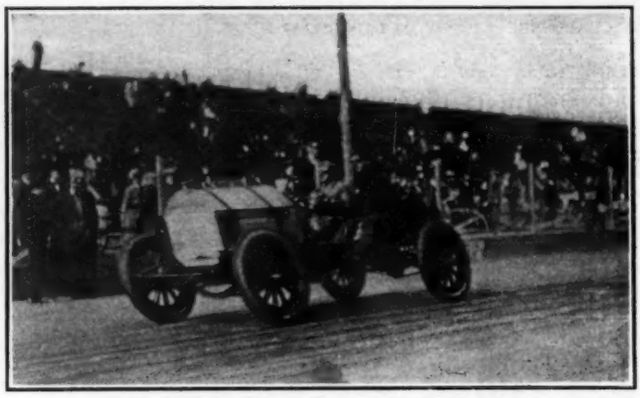
Banked turn into Ferguson Road from Montgomery Road

The repair gangs were kept busy right up to the hour of starting

Nearing the end of the beautiful stretch on Waters Road



Nikrent in the Marmon doing a fast lap over the course



Harry Cobe giving his Vanderbilt Jackson a fast tryout

When it came to a race among the three E-M-F machines No. 35 took the lead and maintained it, the other two not changing their places. They all ran consistently, as an analysis of their lap times will show.

The small car races proved most interesting, more interesting perhaps than had generally been expected. The Mercer-Marmon duel in the Savannah was almost as fascinating as the fight between the winner and the foreign contenders in the Vanderbilt race. The fact that in the Savannah race two American teams battled for the trophy, and that Hughes' Mercer that did so much excellent work during the past season, finally finished as the victor did much toward arousing the enthusiasm of the spectators. The victory of the E-M-F in the Tiedeman Trophy event, however commendable, did not come quite unexpected, the car having shown its great strength and speed earlier this year, especially on the Brighton Beach track.

TABLE SHOWING FASTEST LAPS IN SAVANNAH RACE

No.	Car.	Lap Time	Lap Time	Lap Time	Lap Time	Fastest Lap M.P.H.
22	Mercer	6—14.47	7—14.49	5—14.51	8—14.53	71.2
21	Marmon	3—15.12	5—15.12	4—15.13	7—15.14	68.0
25	Marmon	6—15.26	7—15.29	8—15.30	5—15.32	67.2
24	Mercer	8—14.11	3—14.50	2—14.55	4—15.17	73.0
23	Case	5—18.39	4—18.45	7—18.50	3—18.56	56.0
27	Mercer	6—15.03	7—15.06	4—15.08	2—15.09	68.3
26	Case	2—14.42	3—14.48	4—14.53	1—14.56	71.2

POSITION OF SAVANNAH CARS AT END OF EACH LAP

No.	Car and driver	1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th
22	Mercer, Hughes	2	3	3	2	1	1	1	1	1	1	1	1	1
21	Marmon, Heineman	5	5	5	5	4	3	3	2	2	2	3	3	2
25	Marmon, Nikrent	6	6	6	6	5	5	4	4	4	4	4	4	3
24	Mercer, Barnes	4	2	2	3	2	4	5	3	3	3	2	2	
23	Case, Buckley	7	7	7	7	6	6	6	6	5	5			
27	Mercer, Knipper	3	4	4	4	3	2	2	5					
26	Case, Disbrow	1	1	1	1									

FASTEST INDIVIDUAL LAPS IN RACE FOR TIEDMAN TROPHY

No.	Car	Lap Time	Lap Time	Lap Time	Lap Time	Fastest Lap M.P.H.
31	Abbott-Detroit	1—16.23	2—16.24	3—16.30	4—16.32	63
35	E.M.F.	8—17.17	9—17.20	7—17.22	5—17.29	59.8
36	Ford	5—17.36	8—18.06	2—18.57	6—19.01	59.2
33	E.M.F.	9—17.43	8—17.47	6—17.50	7—17.53	57.6
34	E.M.F.	5—17.43	4—17.45	6—17.45	7—17.45	57.6
32	Abbott-Detroit	1—18.04				57

TABLE SHOWING POSITIONS OF CARS IN EACH LAP OF TIEDMAN RACE

No..	Car and Driver	1st	2d	3d	4th	5th	6th	7th	8th	9th	10th
35	E.M.F., F. Witt	2	2	2	2	2	2	1	1	1	1
34	E.M.F., R. Evans	4	3	3	3	3	3	2	2	2	2
33	E.M.F., J. Tower	5	4	4	4	4	4	3	3	3	3
36	Ford., F. Kulick	6	5	5	5	5	5	4	4	4	4
31	Abbott-Detroit, M. Roberts	1	1	1	1	1	1				
32	Abbott-Detroit, R. Hartman	3									

Georgia Tour a Success

SAVANNAH, GA., Nov. 25—With only two penalizations, both of 1,000 points for withdrawal, the Tour Around Georgia reached here this afternoon, the contestants covered with the white dust of the shell roads of Southern Georgia. The penalized cars are: the Buick, No. 50, which was side-swiped and overturned by a passing car near Americus on the first day's run, and the Dorris, No. 17, which broke a wheel just outside Baxley on the third day's run.

The tourists left Atlanta, Nov. 22 and checked in at Americus, the first night stop. The second day's run brought them to Valdosta and the third to Baxley, to-day's trip from Baxley to this city making the total mileage 502.4. At each stop the cars received a rousing welcome and on their arrival here this afternoon were escorted into the city by a band and a large number of automobiles.

After the Grand Prize race the tourists will make the return trip to Atlanta a two-days' run, checking out here December 1.

Annual Banquet of L. I. A. C.

The Long Island Automobile Club, Prospect Park Plaza, Brooklyn, will hold its annual dinner at the clubhouse on Wednesday evening, December 6. It will be served by a well-known caterer, and arrangements are now being made to have a good vaudeville follow.

Free Entry for Foreign Racing Cars

WASHINGTON, D. C., Nov. 27—The secretary of the treasury has informed collectors of customs that the following articles of the customs regulations of 1908 have been amended to read as follows:

"Article 595. Motor cars, motorcycles, etc., and accessories, of foreign origin imported into this country by the owners personally for bona-fide touring purposes only, provided such owners are non-residents of the United States, are entitled to free entry under bond for a stay of six months; provided, however, that such owner shall present at the time of making entry a certificate from the United States consul at the port of exportation, based upon the sworn statement of the owner, to the effect that the said article is brought to this country for touring purposes only and that the same is not to be used for any commercial purposes or business pursuits whatsoever while in the United States. The articles enumerated may accompany the owner or arrive within 30 days before or after his arrival.

"Article 596. Motor cars, motorcycles, motor boats, etc., brought into this country by non-residents of the United States, for the purpose of racing or taking part in other specific contests are entitled to free entry under bond for a stay of not exceeding six months, but cannot be admitted hereunder for display in shows or exhibitions of any kind, nor for any commercial or trade purposes whatsoever. Such purposes shall be evidenced by the oath of the owner or his agent made before the United States consul at the port of exportation and by him certified, and presented at the time of entry."

Self-Starting Commercial Car

PHILADELPHIA, PA., Nov. 27—The Philadelphia Truck, the latest addition to the commercial vehicle line, was placed on exhibition to-day at A. G. Spalding's on Broad street, above Race.

The Philadelphia truck is equipped with an electric self-starting device, and is the product of the Philadelphia Truck Co.

Official Records of A. A. A. for 1911

STRAIGHTAWAY FREE-FOR-ALL, REGARDLESS OF CLASS

Distance	Time	Driver	Car	Place	Date
1 kilo...	15.88	Burman	Blitzen Benz	Daytona	Apr. 23, 1911
1 mile...	25.40	Burman	Blitzen Benz	Daytona	Apr. 23, 1911
2 miles...	51.28	Burman	Blitzen Benz	Daytona	Apr. 23, 1911
5 miles...	2:34	Hemery	Darracq	Daytona	Jan. 24, 1906
10 miles...	5:14 2-5	Bruce-Brown	Benz	Daytona	Mar. 24, 1909
15 miles...	10:00	Lancia	Fiat	Daytona	Jan. 29, 1906
20 miles...	13:11.92	Burman	Buick Bug	Jacksonville	Mar. 30, 1911
50 miles...	35:52.31	Burman	Buick Bug	Jacksonville	Mar. 28, 1911
100 miles...	1:12:45 1-5	Bernin	Renault	Daytona	Mar. 6, 1908
150 miles...	1:55:18	Disbrow	Special	Jacksonville	Mar. 31, 1911
200 miles...	2:34:12	Disbrow	Special	Jacksonville	Mar. 31, 1911
250 miles...	3:14:55	Disbrow	Special	Jacksonville	Mar. 31, 1911
300 miles...	3:53:33.50	Disbrow	Special	Jacksonville	Mar. 31, 1911
81.65 miles	One Hour				Mar. 28, 1911

(Standing Start)

1 mile...	40.53	Oldfield	Benz	Daytona	Mar. 16, 1910

CLASS "B" STRAIGHTAWAY RECORDS (STOCK CHASSIS)

161 to 230 Cubic Inches

Distance	Time	Driver	Car	Place	Date
5 miles...	4:24.13	Towers	War-Detroit	Jacksonville	Mar. 29, 1911
10 miles...	9:10.52	Towers	War-Detroit	Jacksonville	Mar. 30, 1911

231 to 300 Cubic Inches

10 miles...	8:16.35	Wilson	Cole	Jacksonville	Mar. 29, 1911

301 to 450 Cubic Inches

1 kilo...	26.75	Merz	National	Jacksonville	Mar. 29, 1911
1 mile...	40.32	Wilcox	National	Jacksonville	Mar. 30, 1911
5 miles...	3:56.82	Wilcox	National	Jacksonville	Mar. 30, 1911
10 miles...	8:03.67	Merz	National	Jacksonville	Mar. 29, 1911

SPEEDWAY RECORDS, REGARDLESS OF CLASS

Distance	Time	Driver	Car	Place	Date
¼ mile...	8.16	Burman	Blitzen Benz	Indianapolis	May 29, 1911
½ mile...	16.80	Burman	Blitzen Benz	Indianapolis	May 29, 1911
1 kilo...	21.40	Burman	Blitzen Benz	Indianapolis	May 29, 1911
1 mile...	35.35	Burman	Blitzen Benz	Indianapolis	May 29, 1911
2 miles...	1:15.96	Bragg	Fiat	Los Angeles	Apr. 13, 1910
5 miles...	3:15.62	De Palma	Fiat	Los Angeles	Apr. 8, 1910
10 miles...	6:35.62	Robertson	Simplex	Los Angeles	Apr. 9, 1910
15 miles...	10:25.17	Hearne	Benz	Indianapolis	July 4, 1910
20 miles...	14:06.72	Hearne	Benz	Indianapolis	July 4, 1910
25 miles...	18:22.60	Tetzlaff	Lozier	Los Angeles	Mar. 19, 1911
50 miles...	36:35.80	Tetzlaff	Lozier	Los Angeles	Mar. 19, 1911
75 miles...	54:50.20	Tetzlaff	Lozier	Los Angeles	Mar. 19, 1911
100 miles...	1:14:29.20	Tetzlaff	Lozier	Los Angeles	Mar. 19, 1911
150 miles...	1:57:15	Bruce-Brown	Fiat	Indianapolis	May 30, 1911
200 miles...	2:39:28	Bruce-Brown	Fiat	Indianapolis	May 30, 1911
250 miles...	3:17:49	Bruce-Brown	Fiat	Indianapolis	May 30, 1911
300 miles...	4:01:25	Harroun	Marmon	Indianapolis	May 30, 1911
350 miles...	4:42:38	Mulford	Lozier	Indianapolis	May 30, 1911
400 miles...	5:23:15	Harroun	Marmon	Indianapolis	May 30, 1911
450 miles...	6:03:01	Mulford	Lozier	Indianapolis	May 30, 1911
500 miles...	6:42:08	Harroun	Marmon	Indianapolis	May 30, 1911

(Hour Records)

74 miles...	1:00:00	Harroun	Marmon	Los Angeles	Apr. 16, 1910
148 miles...	2:00:00	Harroun	Marmon	Los Angeles	Apr. 16, 1910

ONE MILE CIRCULAR DIRT TRACK RECORDS

Distance	Time	Driver	Car	Place	Date
1 mile...	48.62	Burman	Blitzen Benz	Brighton B'h.	Sept. 4, 1911
2 miles...	1:37.89	Burman	Blitzen Benz	Brighton B'h.	Sept. 2, 1911
3 miles...	2:30.55	De Palma	Fiat	Syracuse	Sept. 17, 1910
4 miles...	3:22.27	De Palma	Fiat	Syracuse	Sept. 17, 1910
5 miles...	4:11.90	De Palma	Fiat	Syracuse	Sept. 17, 1910
10 miles...	8:31 1-5	De Palma	Fiat	Narbeth, Pa.	Sept. 24, 1910
15 miles...	13:41.40	Oldfield	Darracq	Milwaukee	Sept. 27, 1910
20 miles...	18:15	Oldfield	Darracq	Milwaukee	Sept. 27, 1910
25 miles...	22:47	Oldfield	Darracq	Milwaukee	Sept. 27, 1910
50 miles...	47:21.65	De Palma	Simplex	Syracuse	Sept. 16, 1911
75 miles...	1:19:39	Strang	Buick	Columbus, O.	July 3, 1909
100 miles...	1:41:00 2-5	Burman	Buick	Columbus, O.	July 3, 1909

CLASS "B" SPEEDWAY RECORDS

(Stock Chassis, Piston Displacement, Minimum Weight)

451 to 600 Cubic Inches

Distance	Time	Driver	Car	Place	Date
5 miles...	4:01.36	Oldfield	Knox	Indianapolis	May 30, 1910
10 miles...	7:47.71	Robertson	Fiat	Atlanta	Nov. 11, 1909
20 miles...	15:57.41	De Palma	Fiat	Atlanta	May 5, 1910
50 miles...	42:02.98	Robertson	Fiat	Atlanta	Nov. 13, 1909
100 miles...	1:22:35.35	Robertson	Fiat	Atlanta	Nov. 13, 1909
150 miles...	2:05:00.63	Robertson	Fiat	Atlanta	Nov. 13, 1909
200 miles...	2:53:48.32	Disbrow	Rainier	Atlanta	Nov. 13, 1909

301 to 450 Cubic Inches

5 miles...	4:05.76	Kincaid	National	Indianapolis	May 27, 1910
10 miles...	7:55.12	Aitken	National	Indianapolis	July 2, 1910
15 miles...	11:48.78	Aitken	National	Indianapolis	July 1, 1910
20 miles...	15:57.63	Dawson	Marmon	Indianapolis	May 27, 1910
50 miles...	39:47.35	Dawson	Marmon	Atlanta	Nov. 3, 1910
75 miles...	1:00:16.34	Dawson	Marmon	Indianapolis	May 27, 1910
100 miles...	1:23:43.11	Kincaid	National	Indianapolis	May 27, 1910
150 miles...	2:05:02.17	Chevrolet	Buick	Atlanta	Nov. 9, 1909
200 miles...	2:46:48.47	Chevrolet	Buick	Atlanta	Nov. 9, 1909
250 miles...	4:38:57.4	Burman	Buick	Indianapolis	Aug. 19, 1909

231 to 300 Cubic Inches

Distance	Time	Driver	Car	Place	Date
5 miles..	4:16	Dawson	Marmon	Indianapolis	July 2, 1910
10 miles...	8:16.08	Harroun	Marmon	Indianapolis	May 27, 1910
20 miles...	17:10.70	Chevrolet	Buick	Atlanta	Nov. 11, 1909
25 miles...	21:48.92	Harroun	Marmon	Indianapolis	May 30, 1910
50 miles...	42:41.33	Harroun	Marmon	Indianapolis	May 30, 1910
75 miles...	67:31.07	Harroun	Marmon	Atlanta	Nov. 11, 1909
100 miles...	1:30:08.31	Harroun	Marmon	Atlanta	Nov. 11, 1909

161 to 230 Cubic Inches

4 miles...	3:49	Witt	E-M-F	Atlanta	Nov. 3, 1910
5 miles...	4:35.47	L. Chevrolet	Buick	Indianapolis	July 2, 1910
10 miles...	8:55.40	L. Chevrolet	Buick	Indianapolis	July 2, 1910
20 miles...	19:51	Knipper	Chalmers	Atlanta	Nov. 12, 1909
50 miles...	50:36	Nelson	Buick	Atlanta	Nov. 9, 1909
100 miles...	1:40:46.81	Knipper	Chalmers	Atlanta	Nov. 10, 1909

160 Cubic Inches and Under

1 mile...	0:56.80	Witt	Flanders	Indianapolis	Nov. 13, 1911
5 miles...	4:22.98	Witt	Flanders	Indianapolis	Nov. 13, 1911
10 miles...	9:27.49	Witt	Flanders	Indianapolis	Nov. 13, 1911
15 miles...	14:13.26	Witt	Flanders	Indianapolis	Nov. 13, 1911
20 miles...	19:00.87	Witt	Flanders	Indianapolis	Nov. 13, 1911

CLASS "C" SPEEDWAY RECORDS

(No Restriction Other Than Piston Displacement)

160 Cubic Inches and Under

Distance	Time	Driver	Car	Place	Date
5 miles...	4:26.08	Evans	Flanders	Indianapolis	Nov. 13, 1911
10 miles...	8:53.97	Evans	Flanders	Indianapolis	Nov. 13, 1911
15 miles...	13:24	Evans	Flanders	Indianapolis	Nov. 13, 1911
20 miles...	17:54.82	Evans	Flanders	Indianapolis	Nov. 13, 1911

161 to 230 Cubic Inches

5 miles...	4:20.20	J. Nikrent	Buick	Los Angeles	Apr. 15, 1910
10 miles...	8:40.17	J. Nikrent	Buick	Los Angeles	Apr. 15, 1910
15 miles...	13:14.52	J. Nikrent	Buick	Los Angeles	Apr. 9, 1910
20 miles...	17:37.36	J. Nikrent	Buick	Los Angeles	Apr. 9, 1910
25 miles...	21:41.37	Anthony	Regal	Los Angeles	Oct. 21, 1911
50 miles...	43:49.69	Endicott	Cole	Los Angeles	Apr. 9, 1910

231 to 300 Cubic Inches

5 miles...	3:55.97	Harroun	Marmon	Los Angeles	Apr. 10, 1910
10 miles...	7:47.20	Hanshue	Mercer	Los Angeles	Oct. 21, 1911
15 miles...	12:59.95	Siefert / Harroun	Dorris / Marmon	Los Angeles	Apr. 8, 1910
20 miles...	17:15.47	Harroun	Marmon	Los Angeles	Apr. 8, 1910
25 miles...	19:48.97	Jeffkins	Schacht	Los Angeles	Oct. 22, 1911
50 miles...	42:30.08	Siefert	Dorris	Los Angeles	Apr. 8, 1910
75 miles...	1:03:54.28	Harroun	Marmon	Los Angeles	Apr. 8, 1910
100 miles...	1:25:22.07	Harroun	Marmon	Los Angeles	Apr. 8, 1910

301 to 450 Cubic Inches

5 miles...	3:49.36	J. Nikrent	Buick	Los Angeles	Apr. 17, 1910
10 miles...	7:36.61	J. Nikrent	Buick	Los Angeles	Apr. 17, 1910
15 miles...	12:04.99	Dawson	Marmon	Los Angeles	Apr. 15, 1910
20 miles...	16:04.40	Harroun	Marmon	Los Angeles	Apr. 15, 1910
25 miles...	20:08.69	Harroun	Marmon	Los Angeles	Apr. 15, 1910
50 miles...	39:53.55	Harroun	Marmon	Los Angeles	Apr. 15, 1910

451 to 600 Cubic Inches

5 miles...	3:38.61	Oldfield	Knox	Los Angeles	Apr. 16, 1910
10 miles...	7:20.66	Oldfield	Knox	Los Angeles	Apr. 16, 1910
15 miles...	11:32.34	Marquis	Isotta	Los Angeles	Apr. 10, 1910
20 miles...	15:29.18	Marquis	Isotta	Los Angeles	Apr. 10, 1910
25 miles...	19:24.92	Marquis	Isotta	Los Angeles	Apr. 10, 1910
50 miles...	39:20.69	Marquis	Isotta	Los Angeles	Apr. 10, 1910

24-HOUR TRACK RACES

Stock Chassis	Lozier	Patschke & Mulford	1,196 mi. Br'ton B'h.	Oct. 15, 1909
Class "C"	Stearns	Poole & Patschke	1,253 mi. Br'ton B'h.	Oct. 19, 1910
Cl. "C" Spdwy	Fiat	Verbeck & Hirsh	1,491 mi. Los Ang's.	Apr. 8, 1911

1911 ROAD RACES

Panama-Pacific, February 22, 1911

Classification	Car	Driver	Distance	Time	M.P.H.
161-230 Class C	Ford	O'Brien	Running when Race called.		
231-300 Class C	Mercer	Bigelow	98.307	102:54	57.32
301-600 Class C	National	Merz	152.922	137:20	66.81
Free-for-all	P-Hart'd	Dingley	163.845	149:30	65.75

Bakersfield, California, July 4, 1911

Under 300 Class C	Buick	L. Nikrent	100.35 m.	135:34.60	44.41
Free-for-all	National	Herrick	156.1 m.	178:58.20	52.33

Elgin National, Elgin, Ill., Aug. 25-26, 1911

Under 600 st. chas.	National	Zengel	305 m. 204 ft.	275.39.08	66.38
301-450 st. chas.	National	Herr	203 m. 1896 ft.	185:55	65.628
231-300 st. chas.	Mercer	Hughes	169 m. 2460 ft.	157:21.52	64.616
161-230 st. chas.	Ab-Detroit	Roberts	135 m. 3024 ft.	151:11.32	53.802

Fairmount Park Road Race, Philadelphia, Pa., October 9, 1911

601-750 cl. C, div. 6	C. Benz	Bergdoll	202.5	198:41.35	61.149
451-600 cl. C, div. 5	C. Lozier	Mulford	202.5	201:52.78	60.18
301-450 cl. C, div. 4	C. National	Disbrow	202.5	208:22.32	58.308
231-300 cl. C, div. 3	C. Mercer	Hughes	202.5	209:45.30	57.916

Cincinnati Fern Bank Dam Road Race Cincinnati, O., Sept. 9, 1911

Under 600 Class C	Fiat	Hearne	197.5 m.	209:03.20	56.682
Under 300 Class C	Cole	Jenkins	150.1 m.	166:29	54.09

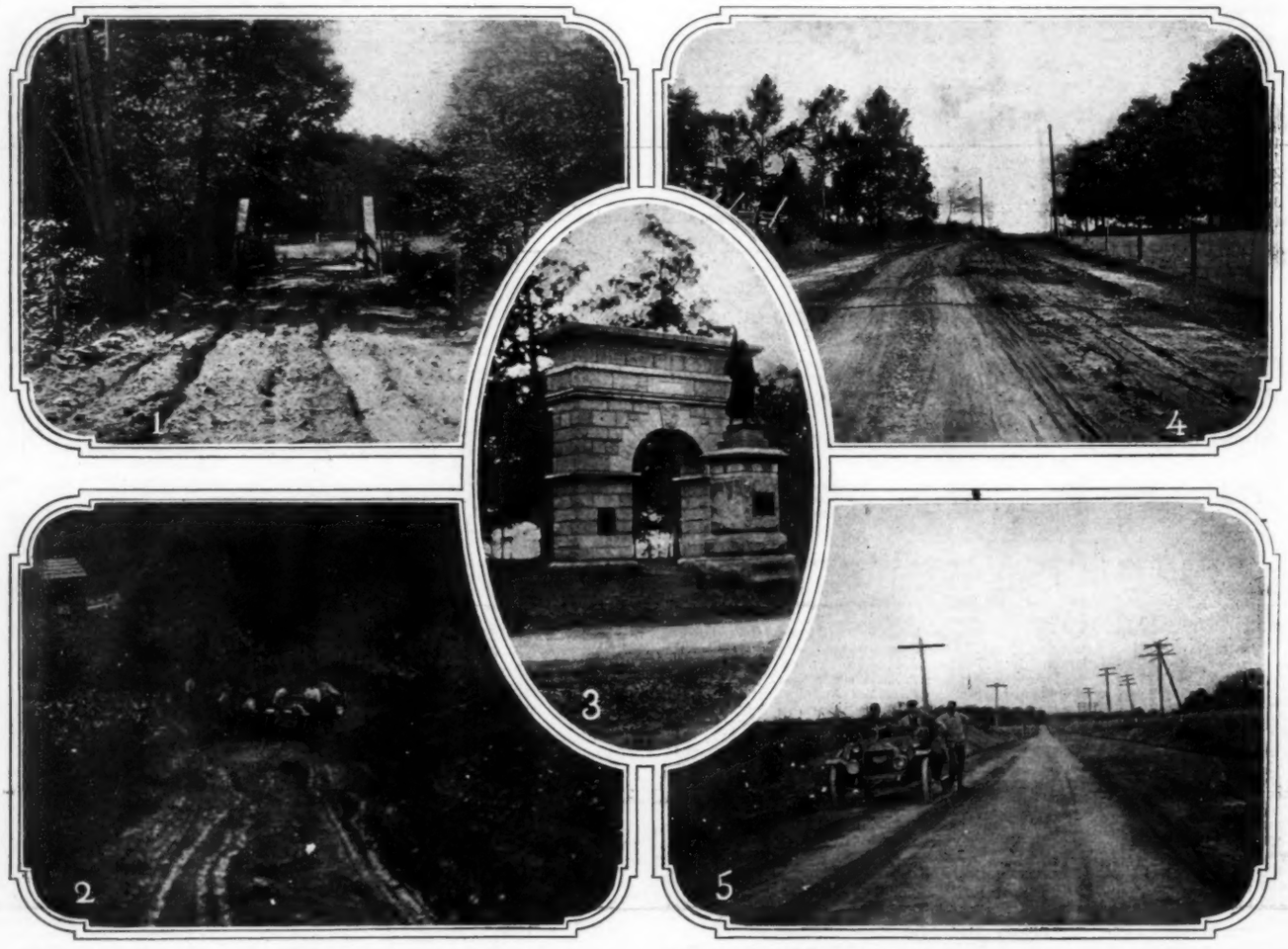
Santa Monica (Calif.) Road Race, October 14, 1911

Under 230 Class C	Buick	L. Nikrent	101.004 m.	102:21.70	59.20
231-300 Class C	Marmon	Keene	151.506 m.	132:09.95	68.78
301-450 Class C	National	Merz	151.506 m.	122:08.45	74.4228
Free-for-all	National	Herrick	202.008 m.	162:24.60	74.628

Desert Race, Los Angeles and Phoenix, November 4-6, 1911

Free-for-all	National	Herrick	551	1223	27:03

Civic Pride in Davidson County, and



1—One of Davidson County's contributions to Glidden tour misery

3—Revolutionary War memorial arch erected on the battlefield of Guilford Court House

2—The State is level, but in the north some heavy grades are found

4—Red clay road near Oak Ridge, an excellent example of the State roads

5—For 10 miles into Charlotte the macadam roadway is almost perfect

PRECONCEIVED impressions of North Carolina, held by the average Northerner, are far from the mark. Those who have not had the privilege of a recent visit to the Old North State, as it is affectionately called by its residents and neighbors, possess only the most shadowy ideas as to actual conditions that obtain there. In many ways North Carolina is the most advanced of the Southern States. Instead of being poverty-stricken, ignorant and narrow, it is doubtful if better general conditions of living obtain anywhere in the country.

Tobacco, cotton and corn grow abundantly and in high quality almost everywhere in North Carolina; the manufacturing of cloth and yarns and furniture and tobacco is voluminous; retail and wholesale merchandising is large in volume and prosperous and in every way the State is full of life. Needless to say, the roads of North Carolina are good.

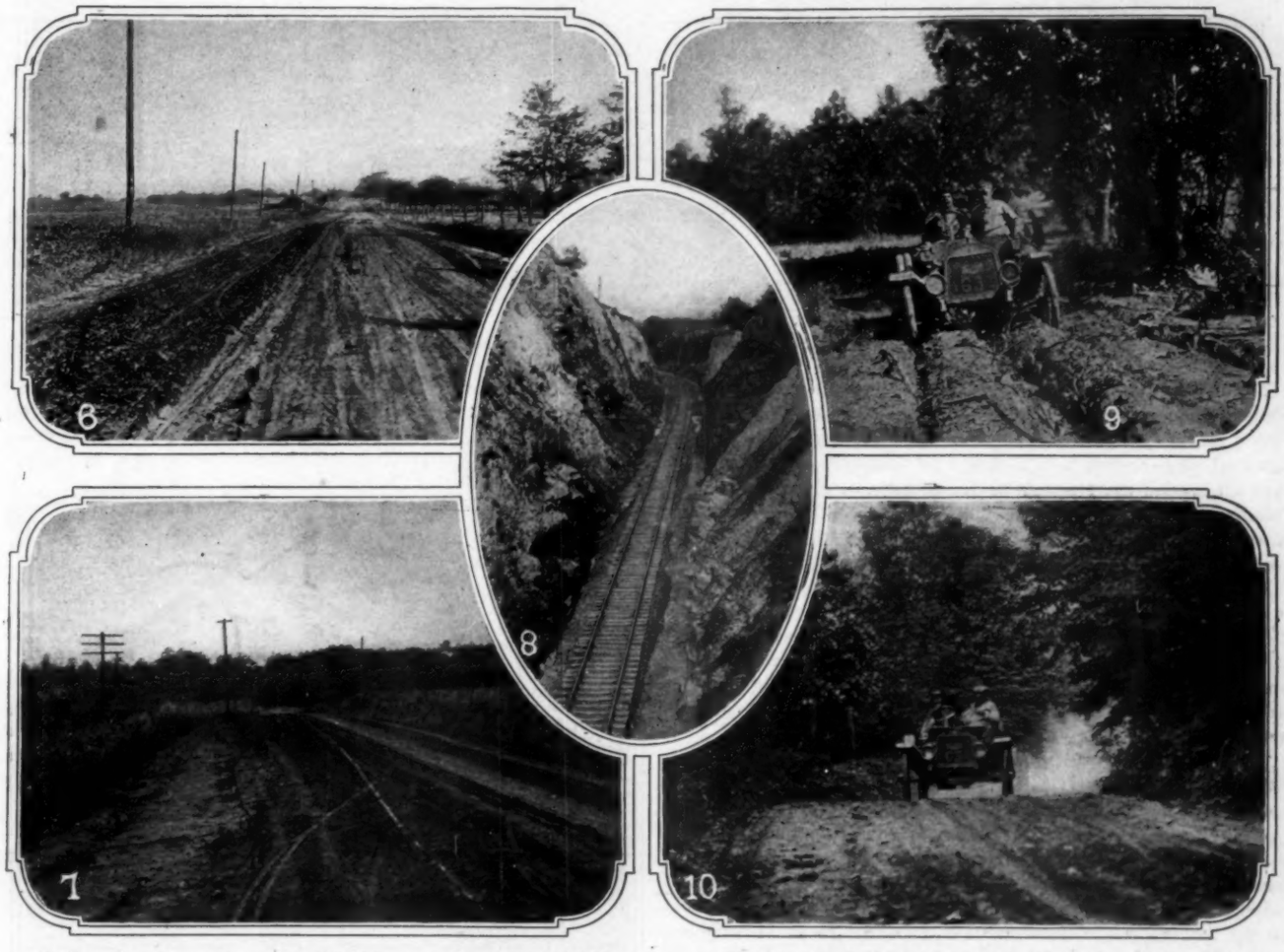
The tobacco mills at Winston-Salem are among the greatest in the world; the furniture factories at High Point turn out a product that rivals Grand Rapids and the cotton mills of Charlotte are stupendous in size and turn-out.

It is said that child labor in the mills is a menace and it probably is, but that is an economic problem and like all other economic problems it can be worked out only through evolution and the general advancement of education. Curious as it may seem the automobile is not in common use. In the big centers of population there are quite a number of cars, but many of the medium-priced lines are not handled at all or are handled in a desultory sort of way not likely to increase their popularity.

In Winston-Salem for instance, where there is abundant prosperity and plenty of money that could be used in the purchase and operation of automobiles, the industry is not what it should be. There is a big field in North Carolina for the agent of any of the moderate-priced lines who will devote as much time and energy to his business as he would have to in any other locality to achieve success.

He has the best argument in the world for making sales—good roads. He has to deal with a real potential buying power, for the money is there. The people understand the value of transportation, because the theorem has been demonstrated to them so often and so conclusively. To the farmer who used to be able to haul a single bale of cotton to market over roadless wastes, no further argument is necessary after pointing out that he can now haul five bales with the same horsepower at much higher speed, using the roads that were born when the automobile came into vogue.

Hotels, Are North Carolina's Needs



6—Example of recently constructed highway south of Summerfield

8—Railroad cut through King's Mountain, corresponding to the highway improvement

7—Here is a typical road scene—this picture was taken near Gastonia

9—The trip into Lexington is not exactly the best in the world

10—Grades and rough spots are to be found in entering Stonesville

The Old North State is at one disadvantage, however, in its road making. Stone is scarce, and as a consequence a mixture of clay and sand represents the commonest and most available surfacing material. This makes an excellent road and with proper grading and scraping at intervals, answers present purposes very well indeed.

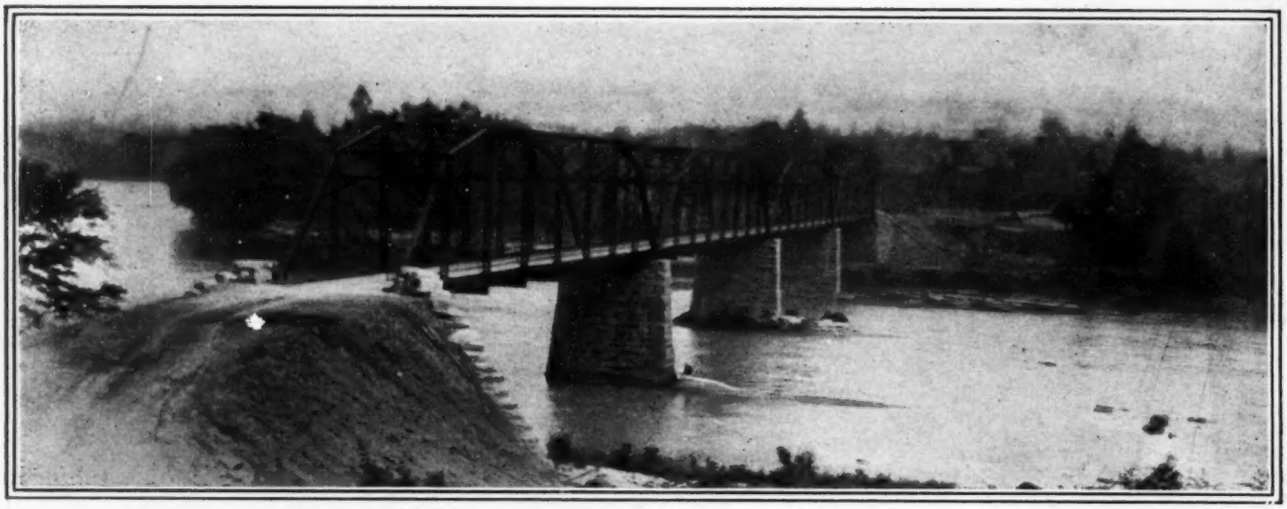
There is only one real bad spot in the State, and it is a disgrace. Davidson County, N. C., will long be remembered by the participants in the recent Glidden Tour for its frightful highways. The city of Lexington, situated in the center of the celebrated Piedmont region, is the county seat of Davidson County. On both sides of Lexington the roads are rough and neglected. No effort has been made for years to improve conditions. There is one place north of the city where the road crosses a savage mud-hole that could be bridged for a few thousand dollars, where traffic is almost impossible. It has been estimated by some of the progressive people of Lexington that this one mud-hole costs the local industries something in excess of $100,000 a year by diverting produce from its natural center.

A bridge costing not more than $4,000 and work on the roads calling for not more than $200 per mile per year, or a total initial expenditure of $6,000 and an annual expense of not more than $2,000 a year thereafter, would mean at least $100,000 more to the city of Lexington. If in addition, $10,000 a year could be used in permanent and current road improvements from side to side of Davidson County to better the main north and south highway traveled by the Glidden Tour, it is as certain as mathematics, that the profits of Lexington would run close to $1,000,000 a year more than they do under present conditions.

Commencing at the Virginia State line, the mileage of the main road across North Carolina to Grover, just north of the South Carolina line, is 237.5, traveling by the way of Winston-Salem, Greensboro, High Point, Thomasville, Lexington, Salisbury, Concord and Charlotte.

All but about 25 miles in Davidson County consists of good roads. Of these probably 80 miles is of domestic macadam of high quality and the remainder is of graded sand-clay roads that are excellent, any way one looks at, or uses them. Generally speaking these roads are 14 or 16 feet wide and smooth as a floor. In wet weather there is just enough traction to make going easy owing to the sand mixed with the clay, and not enough to destroy tires like the average sand road.

The highway enters North Carolina just before reaching Price Station, 48 miles north of Winston-Salem. When the Glidden



Iron bridge crossing the Catawba River after leaving Spurriers

Tour passed that way it was black night and the first few miles into the Old North State were quite a trial. The road is rough for 5 miles. Just plain, rough, but upon coming to Stoneville a gradual improvement is felt. The road broadens and is straighter and all around more agreeable for touring. From Stoneville to Madison, about 7 miles, the improvement continues and after passing the Dan River the highway sweeps to the South practically straight through the pine forests. swerving only occasionally to round some swelling hillock. There is some little sand to be traversed before reaching Stokesdale, 12 miles to the South, but from that point to Kernersville the way is smooth and fine over graded clay roads of the type that makes up most of the way across the State. Kernersville is about 11 miles from Winston-Salem and the road between consists of excellent macadam.

The Gliddenites made a spectacular run from Kernersville to Winston-Salem. The road is generally 20 feet wide and is in excellent condition. Most of the cars were from 10 minutes to 30 minutes late when they passed Kernersville and the wild sprint to control was the big feature of the tour. Lighted only by their headlamps, the caravan picked out the white macadam with ease and as much as 60 miles an hour was made by some of the more powerful contestants in an effort to avoid penalization. The road lent itself to just such a sprint and the sight from the checking station down the long, gentle incline that approached it, was wonderful.

Winston-Salem is the big, virile combination of two cities, Winston and Salem and is one of the liveliest cities of its class touched on the route to the South. Its tobacco factories are gigantic in size and product and it has a sufficiently diversified industry to insure permanent prosperity. As an educational center the place is noted and one of the features of the reception tendered the Gliddenites was the presence of a throng of beautiful girls, students and graduates of the seminaries located there. Winston-Salem has an excellent hotel, something exceedingly rare south of Mason and Dixon's line. It is far in advance of anything encountered by the tourists in Virginia or in fact anywhere between Philadelphia and Atlanta.

Leaving this agreeable place, the route follows the same splendid stretch of macadam to Kernersville that was traversed in approaching the city, but 2 miles further along the road forks and the right fork leads into the main road to Charlotte. Next Spring it is expected that a macadam highway to Lexington via Midway will be completed, which will cut off 50 miles. This road is passable now, but was not used during the Glidden tour.

The macadam, which was left at Kernersville, commences again at Oak Ridge, 7 miles beyond that place, and continues to Greensboro by the circuitous route pursued. This part of the way passes through Summerfield and Guilford Court House, noted as a bloody battlefield of the Revolutionary war. Memorial arches stand upon the battlefield, and in the quaint cemeteries near the little town there are numerous headstones bearing the names

Long, shaky trestle, leading up to a creek in the woods south of Salisbury

of heroes whose memories are cared for in the rolls of our national history. Here and there among them are memorials to British officers who fell in the big battle and during the campaign that was waged to hold North Carolina to her allegiance to England.

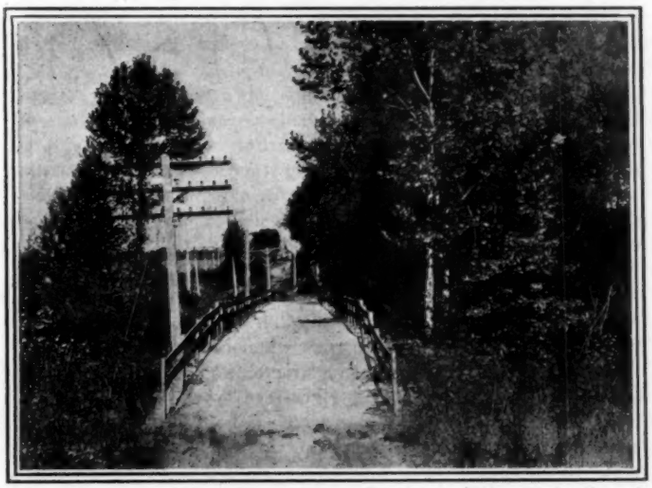
Greensboro is a thriving place which has much manufacturing of various sorts and a rich agriculture. It is one of the best centers in the state for automobiles, as may be surmised from the fact that the roads thereabouts have been awarded first prizes for excellence and a few miles below the city there is a fine, strong bridge that was built by the enterprising citizenship with the prize money that was awarded for their good roads.

High Point, the next considerable town on the route, is 52.2 miles from Winston-Salem by the winding road. This place contains sixty-nine furniture factories and is bubbling full of life and energy. As an instance of its willingness to receive publicity it may be cited that the Glidden Tour was halted for 30 minutes while delicious coffee and sandwiches were distributed through the train of automobiles. Needless to say, the impression created was pleasant. But there are other things about High Point to be commended beside its hospitality. The roads are models of construction and maintenance, the place looks well-groomed and the people seem comfortable. It is said

that solid train loads of furniture are shipped from High Point to the wholesale distributing centers of the United States and that the place will prove more and more of a competitor of Grand Rapids in the markets of the world as the years pass.

But after leaving High Point there is a different story to tell. About 3 1-2 miles to the south the macadam ends with a jerk that nearly threw overboard some of the non-cautious passengers on the tour. On the general average the road into Thomasville may be reckoned fair, but after leaving that place, 61 miles from Winston-Salem, the road grows rapidly no better. There is a rather steep climb that commences 6 miles south of Thomasville and continues up and down all the way to Lexington. In the hills the roads are not so bad, but at the bottoms of the inclines the roads were never intended for automobiles, and much less for any other kind of traffic, especially in wet weather.

There is one particularly vicious spot that is encountered 1-2 mile after beginning the climb. The road makes a half circle, following the hillside, and then shoots south across the flat. In the middle of the short stretch that lies between the bottom and the next up-grade, there is a mud-hole about 100 feet across. No bottom was found for this in spots and many of the cars tried to discover it. Broken wheels, steering gear and sprung axles will be the lot of the motorist who tries to negotiate this



Old wooden bridge a few miles out of Winston-Salem on the way to Kernersville

example of Davidson County, N. C., intelligence, without using the utmost care and skill.

This spot absolutely prohibits wagon traffic in wet weather, and the general impression seems to prevail that the reason for its disrepair lies in the fear that a few bales of cotton might be hauled into High Point or Greensboro from points to the south of Lexington, rather than to market in that city. At any rate such cotton will continue to be marketed at Lexington until the mud-hole is bridged adequately, although it is quite likely that thousands of wagon-loads of produce raised to the north of the obstruction will not make any desperate efforts to come to market at Lexington as long as the mud-hole exists in its present condition.

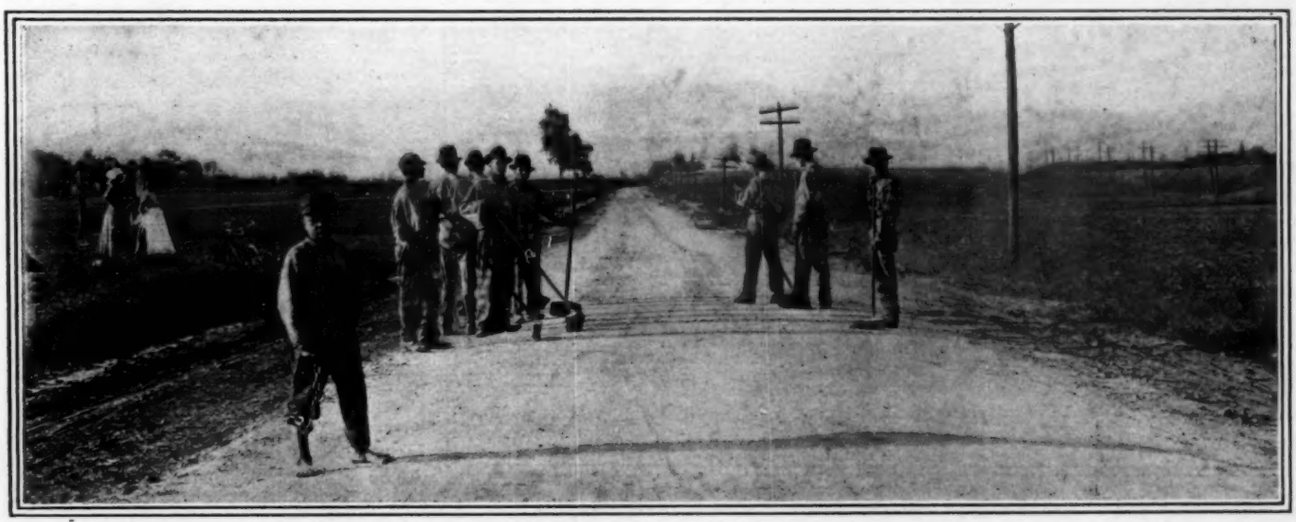
The roads through Davidson County were built by the soldiers of General Greene's army during the Revolution and most of them look as if they had never been touched since that lamented officer passed away. As might be expected, there are numerous fords in Davidson County and a toll gate or two, where the roads are worst.

Salisbury, N. C., is quite a different kind of a place, situated in quite a different sort of a county. As soon as Davidson County is left behind, the roads show a startling improvement. From Salisbury to Concord, a distance of 22 1-2 miles, the route is over graded clay and fine macadam, the latter being found for a mile on either side of all the settlements of any size and continuously for miles on entering and leaving the larger places. Salisbury gave the tour a warm welcome and did its best to make up in hospitality what it lacked in accommodations.

The final 27 miles of the run into Charlotte is notable for the remarkably good macadam roads all the way. For a week prior to the tour a band of convicts was set to work on this stretch of road and when the cars passed it was generally remarked that the road compared favorably with the best in New Jersey as far as smoothness was concerned.

Charlotte is a manufacturing city, developed from an agricultural city. It has good water power and facilities for turning it into electric current. As a result the cotton mills of Charlotte are gigantic affairs turning out immense amounts of cloth and yarns. It is the undoubted cotton manufacturing center of the South. But Charlotte needs hotels. The experience of the Glidden Tour may have been unusual and extraordinary while stopping over night at Charlotte, but it can be said with conviction that nobody connected with the tour enjoyed the stay.

From Charlotte to the South Carolina line is 53.3 miles on the road used for the Glidden Tour, but after next Spring it will be shortened by 10 miles when the detour to cross the Catawba River, using the old iron bridge north of Charlotte, will be eliminated and the river will be crossed just east of Belmont, via a magnificent new concrete bridge that is now being constructed at the scene of Sloan's old ferry, a stumbling block of former years. The roads are fine clear to Bessemer City, being composed of good macadam and nicely improved sand-clay. This is 40 miles from Charlotte and all the way the cotton fields extend as far as the eye will reach.



The macadam road into Concord is as good as any to be found in New Jersey

Franklin Omits Auxiliary Exhaust

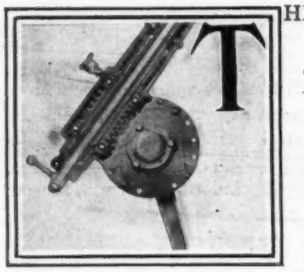


Fig. 1.—Steering detail

THE Franklin Automobile Company, of Syracuse, N. Y., which has just come forward with its latest developments, has not designated the new models by the year in which they are making their appearance, but has departed from this practice and has changed the nomenclature of the different models to a letter system. But few changes mark the introduction of the new cars, the chief of these being the omission of the auxiliary exhaust valve which was located at the bottom of the stroke and through which about 70 per cent. of the exhaust products passed.

The five models which are embraced in the Franklin line include motors of 18, 25, 30 and 38 horsepower, having bores of 3 3-8, 4, 3 5-8 and 4 inches respectively. The stroke of all models is 4 inches and the number of cylinders is four in the case of the first two models mentioned and six in the other two. The details of construction for all four types of motors are similar and a general description of the Franklin motors will fit any of the types manufactured. Where any departure is made from the standard methods it will be mentioned in the following description.

The cylinders are cast separately to provide room for the vertical air flanges, to pass entirely around the cylinders. These ribs by means of which the motors are cooled, are integral parts of the cylinder castings and extend down to the bottom of the combustion space of the cylinder. The valve cages are also parts of the cylinder castings, as may be seen at C, Fig. 2. The cylinders are fastened to the crankcase by means of holding-down bolts B which pass through the flanges at the bottom of the casting and into the upper part of the crankcase. The bottom of these bolts may also be seen at B in Fig. 3. The material from which the cylinders are made is of selected gray iron. The vertical flanges, which are integral parts of the cylinders, are 8 inches in length, 1 inch in depth and 1-16 inch thick, they are set into the cylinder to a depth of 1-8 inch to secure a rigid connection, and are placed at intervals of 3-16 inch entirely around the circumference of the cylinder. An outer covering of sheet metal is placed about the flanges as shown at O, Fig. 2, for the purpose of confining the cooling air to the flanges which form the heat radiating surface.

The cooling air is circulated through the air jacket in a very ingenious manner. A sheet-metal partition is constructed and so placed that it touches the dash, the sides of the hood and the air jackets at about the center of their length, thus dividing the space into two air chambers, one above this partition, which is covered by the motor hood, while the other is below the partition and is covered by the bottom pan of the motor. Between the two air chambers the only possible passage for the air is down through the vertical flanges of the cylinders. A suction fan is located in the flywheel, being formed by the vanes of the wheel. When the motor is in operation the revolving flywheel fan tends to form a vacuum in the lower air chamber, thus bringing currents of the air down from the upper air division which must pass through the cooling flanges to pass into the bottom chamber.

The supply of fresh air in the upper air chamber is unlimited, as it is drawn through a grilled opening in the front end of the engine hood, and since the partial vacuum which is produced in the lower compartment must be equal throughout the compartment, a like amount of air will pass through each cylinder air jacket and the cooling effect on each cylinder will be exactly the same.

Lubrication Receives Special Attention

Owing to the fact that the Franklin motors are required to work at a higher temperature than water-cooled motors the oiling system has been given particular attention. The system used is known as the recirculating force-feed type. The oil is contained in an aluminum sub-base which is bolted to the crankcase and separated therefrom by means of a wire gauze screen partition. In the four-cylinder models the oil reservoir runs the entire length of the crankcase, while in the six-cylinder models the sub-base is beneath cylinders three, four, five and six. The lowest part is beneath the last cylinder, at which point are located an oil gauge, pump and a screw plug for draining purposes. The pump which takes the oil from the reservoir sends it through an individual lead to each main bearing. These leads are exposed as may be seen at L, Fig. 2, in order that they may be readily inspected in case there is any difficulty with this part of the oil system. The oil which is forced through each of these individual leads passes into a groove in the upper half of the main bearing bushings. Another and smaller oil groove intersects the first groove and extends almost the full length of the bushings. A drill hole in the crankshaft communicates with the grooves in the main bearing bushings during out-half of each revolution, and the oil, which is under pressure from the pump, passes through this groove and is carried along into the crank cheeks. The centrifugal force due to the rapidly revolving crankshaft throws the oil into the leads in the connecting rod bushings, the lower halves of which are identical with the main bearings.

The oil which is thus carried to the connecting rod bearings is forced out of them

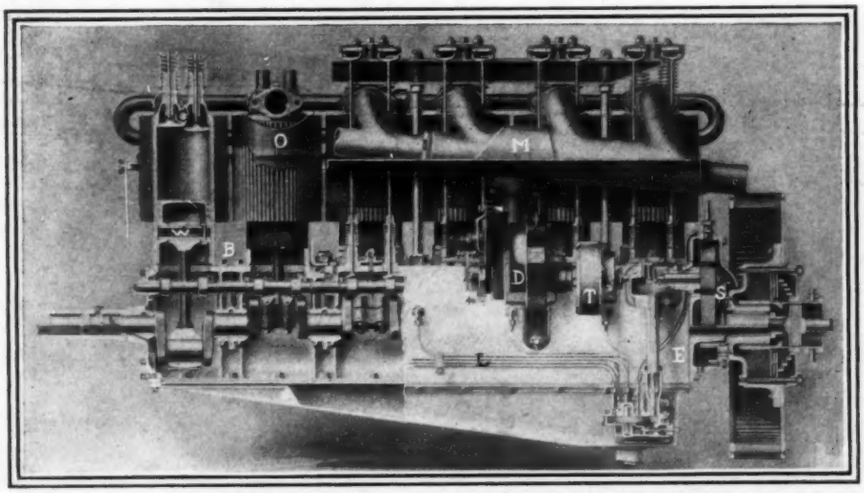


Fig. 2.—Longitudinal view and part section of Franklin air-cooled motor

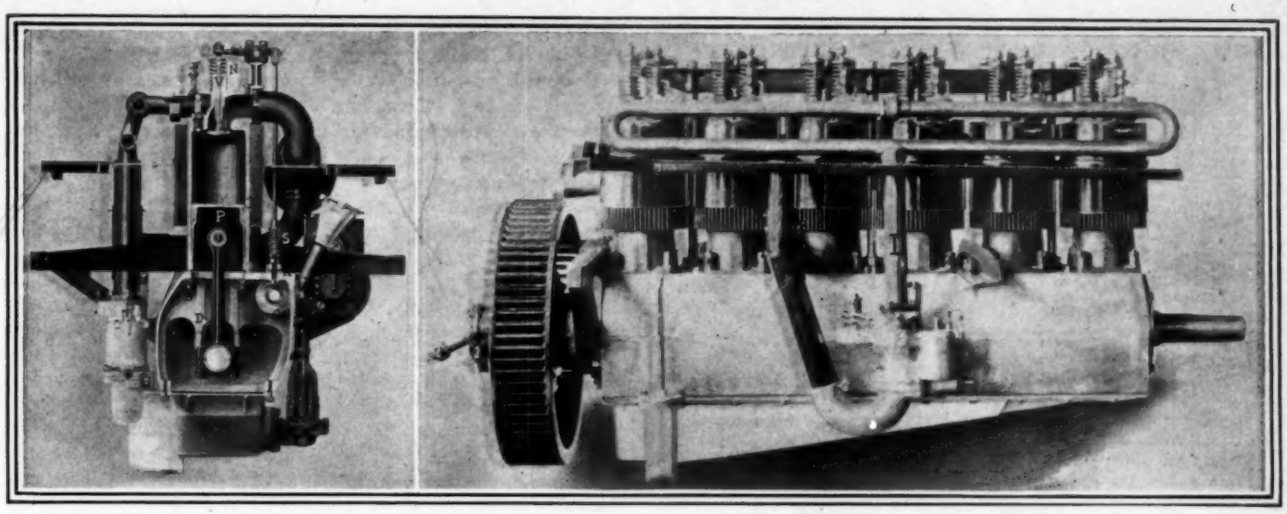


Fig. 3.—Showing transverse section through motor and a longitudinal view of the intake side.

and thrown off the end of the rod in a fine spray which pervades the engine base and lubricates all the moving parts of the motor, including crankshaft bearings, cylinders, pistons and the valve mechanism. The surplus oil drains from the cylinder walls and other interior parts of the motor, and falls down upon the base, where it passes through the mesh gauze and into the reservoir. The gauze strains out any sediment and metallic particles and keeps the oil which passes into the reservoir clean. There is an independent lead E which passes from the pump to a sight feed on the dash. The oil which passes through this sight feed drains back into the rear of the crankcase casting and down over the camshaft, spiral magneto gears and thence back through the wire gauze into the reservoir.

Some Details of Motor Construction

A departure from the lubricating system just described is employed on the Model G runabouts. They are equipped with a multiple force-feed system. Oil is pumped by means of a Hancock oiler to the main bearing.

The reservoir on the Model H and D motors has a capacity of 3 gallons, that on the M 2 1-2 gallons and the G 2 gallons. The Hancock oiler will hold about 7 pints.

The pistons, P, Fig. 3, on all the Franklin motors are fitted with three rings, all of them being above the wristpin. The rings are ground to size and balanced in connection with the pistons. As may be seen in the illustration, the pistons are of the flat-head type and taper in thickness to a point near their lower extremity, where a boss may be seen. A very thin aperture is seen between the wall of the piston and the cylinder in the sectional view. This is for the purpose of catching up the oil from the cylinder wall and distributing it over the upper part of the piston. The wristpin W, Fig. 2, is driven through the aperture in the interior of the piston, and is fixed in position by means of a set screw which passes through it. As the wristpin is hollow and open at either end, a quantity of oil will pass into it which will eventually work its way by means of a duct to the wristpin bearing bushing.

Owing to the method of casting the cylinders singly a main bearing is inserted between each, so that in the four-cylinder models there are five main bearings, and in the six-cylinder models there are seven. These bearings are supported upon bridges which are formed by webs in the crankcase casting. The construction of these bridges may be seen in Fig. 3 at D. The web also forms the basis of the camshaft bearings C and serves generally to stiffen the entire structure.

The valve action is operated by means of a single camshaft located upon the left side of the motor. The valves are separate in the head of the cylinder. The composition of the valves is silico-manganese steel, treated in the electric furnace. Both the intake and exhaust valves are the same size on the D and M models; upon the G, however, the exhaust valve is 1 3-4 inches in diameter, while the intake valve is but 1 1-2 inches. On the model D motor the largest diameter of the exhaust valve head is 1 15-16 inches, with an overall length of 5 15-16 inches. The length of all the valves is 1-4 inch. They are all operated, as may be seen in Fig. 3, by camshaft, the cams of which operate directly upon the pushrod R through the spring S and thence through a walking beam W to the valve stem V. This arrangement is similar to the methods used in former Franklin practice, except that the camshaft is of one-piece construction, being turned down from bar stock, and the cams are integral parts of the shaft.

Valve timing and adjustment is made possible by means of a lock nut which is placed against the walking beam adjusting screw and which is so set that the relative positions of the valve may be changed with the different settings of the flywheel. The fulcrum of the rocker arms is formed by an I-beam support which runs along the top of the cylinders from one end of the motor to the other. The rocker arms touch upon the ends of the valve stems and are held in contact with them by a spiral lifter spring N, Fig. 3, at the base of the valve lifter rod. The rocker arm supports are attached by perpendicular rods to the engine base, so that any variation in valve action, due to the expansion of the cylinders when hot, is rendered impossible.

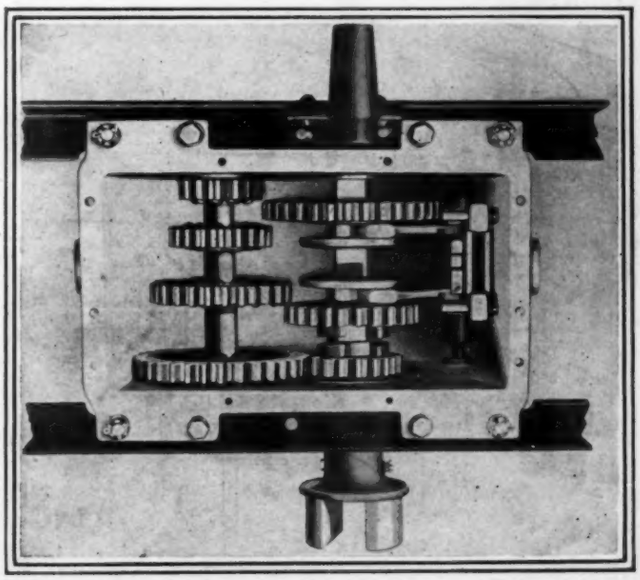


Fig. 4.—Looking down into the Franklin gearset housing with the cover removed

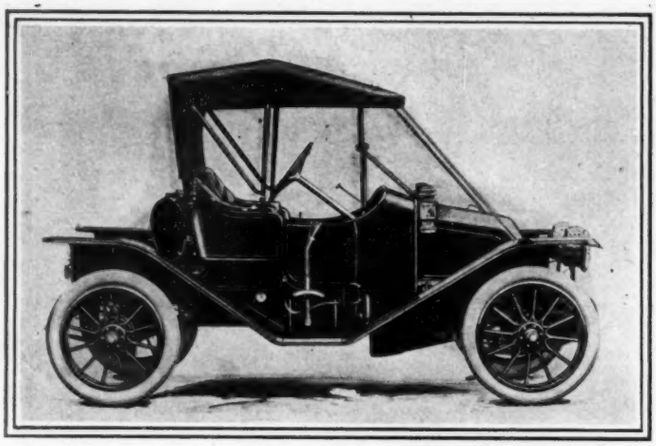


Fig. 5.—The Franklin fore-door roadster showing exterior position of speed-change lever

The carbureter is located on the right side of the motor. It is of the Franklin automatic float-feed type. In the six-cylinder models an auxiliary air intake valve is fitted, which is operated by the suction of the motor. A coil spring keeps the valve seated until the motor pulls more strongly when speeding up, at which time, the suction becoming greater than the strength of the springs, the valve opens and additional air is admitted to the intake manifold. The temperature of the vapor on its way to the combustion chamber may be regulated by a hot-air pipe which draws its supply from a sleeve fitted about the exhaust pipe. In cold weather all of the air taken into the carbureter may be drawn through this hot-air intake; similarly in hot weather the air from the mixture may be governed so that it will not be greater than atmospheric temperature. The carbureter needle valve which controls the supply of gasoline is regulated from the dash. As may be seen at I, Fig. 3, the mixture passes from the carbureter through a vertical pipe which leads into an endless elliptical intake manifold. The vertical pipe enters this manifold on one side while on the other the various leads to the cylinders are fixed. In passing into the cylinders the mixture must go at least half-way around the manifold, so that an equal quantity and quality of mixture is assured to each cylinder. The exhaust manifold M, Fig. 2, is fitted upon the opposite side of the cylinders from the intake, and is of large dimensioned injector type, sloping downward toward the rear of the motor.

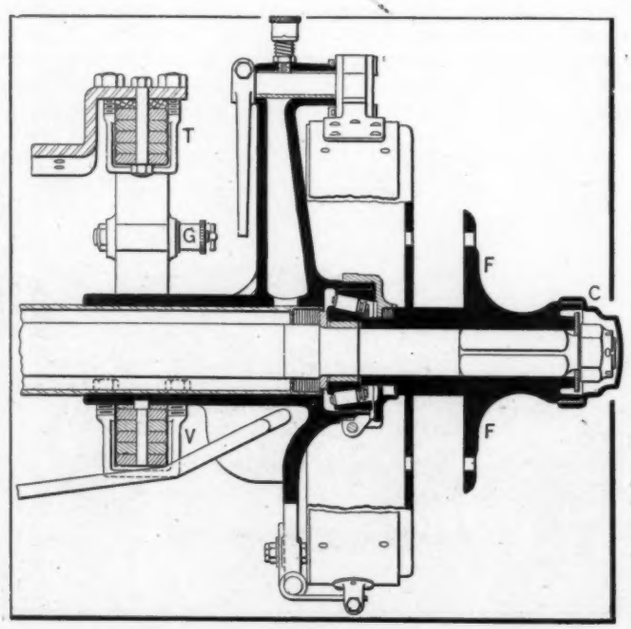


Fig. 6—Section through wheel hub and axle showing brake and spring supports

Ignition is furnished by the Bosch dual system, a high-tension magneto providing the spark, while a storage battery, which is located in a battery box on the running board, supplies the battery ignition. In order to promote accessibility as far as possible, all the wiring is exposed where this can be done without danger. The magneto is shown at D, Fig. 2, and is driven by the train of spiral timing gears S through the camshaft which runs along this side of the crankcase. The speed of the magneto is regulated by a centrifugal governor operated by means of weights and springs within the drum T. The governor shaft has upon its end, within the drum, a gear meshing with two segments which are a part of two pivoted weights located on opposite sides of the drum. As the governor shaft revolves the two weights tend to be thrown by centrifugal force toward the perimeter of the drum. This tendency is resisted by the spiral springs, which are strong enough to hold the weights in their original position until a speed of about 300 revolutions per minute is reached. At that point, however, the automatic brakes by which the spiral springs are assisted give way and allow the weights to start and move outward toward the circumference of the drum. This motion of the weights will move the drum along the magneto shaft to which it is keyed. This advances the armature and sets the spark ahead, thus providing the proper spark for any engine speed. On the left side of the dash is placed a kick switch, which has in its center a button that may be used for starting on the batteries. On the larger models the ignition timing is controlled by the governor, while on the G runabout it is constant.

The clutch is of the Franklin multiple-disc type and is incased in the flywheel. It is operated by a pedal which works through a small round hole in the footboard. The clutch housing is an oil-tight casing and the clutch runs continually in oil. The facing of the clutch is bronze on the driven members and steel on the driving members.

The gearset is of the Franklin selective sliding type, having three forward speeds and one reverse. It is enclosed in an oil-tight casing which may be seen with the cover removed in Fig. 4. The gear wheels are of specially hardened steel designed for durability. A feature of interest in connection with the Franklin gearset is that the shift lever shaft runs across the top of the gearset casing instead of passing through it. This construction allows of a shifting of gears with a shorter movement of the hand. The gear ratio on the H and D models is 3.75 to 1; on models M and G, 3.71 to 1, and on the G runabout, 3.78 to 1. A threaded plug is fitted in the bottom of the aluminum casing, through which the oil may be drawn off when it becomes necessary to renew the supply. The shafting of the gearset runs upon ball bearings.

Transmitting Power to Road Wheels

The drive is taken up by the propeller shaft through a universal joint which is fitted just aft of the gearset casing. This shaft is of special heat-treated steel and is also fitted with a universal joint at the rear end. Power is transmitted by the shaft into the differential by means of a star pinion fitted to the end of the short differential shaft which runs upon ball bearings in forward end of the differential casing. In passing from the universal joint at the rear end of the propeller shaft into the differential casing this short shaft goes through a packing box which precludes the leakage of any oil from the differential through this joint. The packing box casing is held in position by the bolts D, shown in Fig. 7. The star pinion P engages with the bevel wheel D, which is fastened to the annular wheel W, which in turn drives the two spur wheels S. The latter wheels transmit the drive to the live rear axle A. The differential wheels and shafts throughout run upon ball bearings, indicated by T in the illustration. The ends of the axle shafts are squared so that they may easily be withdrawn by simply removing the hub cap C.

The live axles deliver their power to the wheels by means of a flange F, Fig. 6, which is bolted to them by six bolts. The

service brakes are of the contracting type, faced with Raybestos. They operate upon the change-gear shaft. The emergency brakes are also of the contracting type and operate upon bands located at the rear wheel hubs. The emergency brake bands are also faced with Raybestos. The service brakes are controlled by means of a pedal from the driver's seat, while the emergency brakes are controlled by a lever located on the right side of the driver's seat.

The wheels are of the wood artillery type, having twelve spokes both front and rear in all models. The hubs are castings, while the wood used in the construction of the wheels is of second-growth elm or hickory. All the wheels are of standard universal quick detachable type, designed to fit any make of tires. On the Model G touring car the tires to be used are 32 x 4 inches both front and rear. On all other models the rear tire equipment is larger than on the front. On the Models H and D the tire sizes are 36 x 4 1-2 inches and 37 x 5 inches; the Model M, 34 x 4 inches and 34 x 4 1-2 inches; on the G runabout they are 32 x 3 1-2 inches and 32 x 4 inches. The wheelbases are as follows: On the H, 126 inches; D, 123 inches; M, 116 inches, G, 103 inches, and the G runabout, 100 inches.

Laminated Wood Chassis Still Retained

The Franklin company still maintains the wooden chassis which has characterized its line in the past. Laminated wooden sills are the direct support of all styles of body. The front axle is of the built-up type with the knuckle yokes and spring chairs hot riveted to a nickel-steel tube. The knuckle connecting rod is fitted in the rear of the axle tube. The axle is of drop construction. The side members of the frame are of wood built up in laminations, giving a rectangular section. There is no drop in the side frame. Maximum depth of the side members in the Model G runabout is 5 3-4 inches; in all other models a maximum depth of 6 1-2 inches. In all cases the width of the members is 1 3-4 inches.

Elliptic springs are also continued as a feature of this year's cars. On the Model G runabout the width of the spring plates is 1 1-2 inches and the span 36 inches in both front and rear. In the Model G touring cars the width of the plates is 1 3-4 inches, while the span of the springs is 36 inches. In the Models M, D and H the width of the plates both front and rear is 1 3-4 inches, while the span of the spring is in all cases 40 inches. In Fig. 6 the manner of attaching the springs to the chassis by means of U-clips is shown at T and V. Lubrication is provided by means of specially fitted grease cups G which are also shown in the illustration.

The steering gear is of worm-and-gear type actuated by a large steering wheel built up on an aluminum spider. The worm which turns the gear runs upon ball bearings which are adjustable for wear. A section through the steering gearcase is shown at Fig. 1. The throttle control lever is located upon a quadrant situated on the steering wheel spider. This lever actuates a shaft which passes down through the center of the steering column and terminates in a small bell crank lever to which the throttle governing rod is attached. Spark control is entirely automatic and therefore there is no ignition lever upon the steering wheel.

A special accessory fitted to all the new Franklin cars is a gas lock located on the right sill beneath the driver's seat, for the purpose of preventing the theft of the car. In connection with the gas lock valve there is a device for the purification of the gasoline on its way to the carbureter. It consists of a metallic cylindrical chamber located just within the sill and connecting the four-way gasoline valve of the gas lock. Within this cylinder there is a removable screen of fine wire gauze. The gasoline which enters the chamber comes up through the bottom by means of a small standpipe which projects into the chamber more than half-way to the top. The exit of the gasoline is near the top of the chamber and gasoline cannot flow out, therefore, until the compartment is nearly full. Hence, sediment or water will settle to the bottom of this trap and may be drawn out through a cock in the bottom. If it is desired to clean the screen the cover of this chamber may be unscrewed and the screen removed. Among other refinements is a priming rod which projects through the mud apron at the front end of the car. By pulling out this rod the flow chamber of the carbureter is flooded with gasoline so that a rich mixture is procured in case it be necessary to assist in starting the car. Priming cocks are also fitted at the top of each cylinder above the intake valve, through which gasoline may be dropped into the cylinders should it be necessary. A foot accelerator and a muffler cut-out are also a part of the regular equipment, which includes a top, windshield, headlights, tools, storage battery and side and tail lights, the latter on the models H, D and M, being combination oil and electric. On the Model G touring and runabout side and tail lights are adapted for oil only.

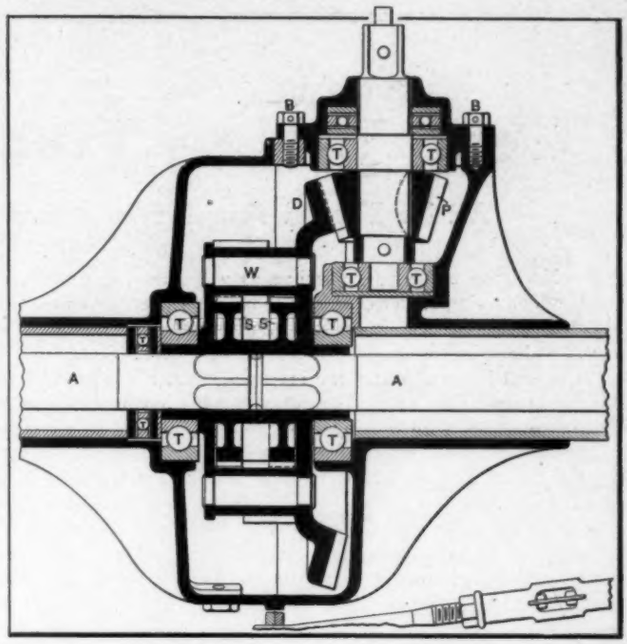


Fig. 7—Showing the differential in sectional view. Note positions of ball bearing

Royal blue is the standard color for all touring models, with striping a tint of the same color. Trimmings are black, and black hand-buffed leather upholstery is used. Metal work is finished in black enamel and nickel. The D torpedo model is painted dark tan with tan trimmings, and is upholstered in dark russet, while the M torpedo phaeton is bronze green, with bronze leather seats and cushions. The sloping hood is continued and the fore-door is also a feature of Franklin 1912 construction.

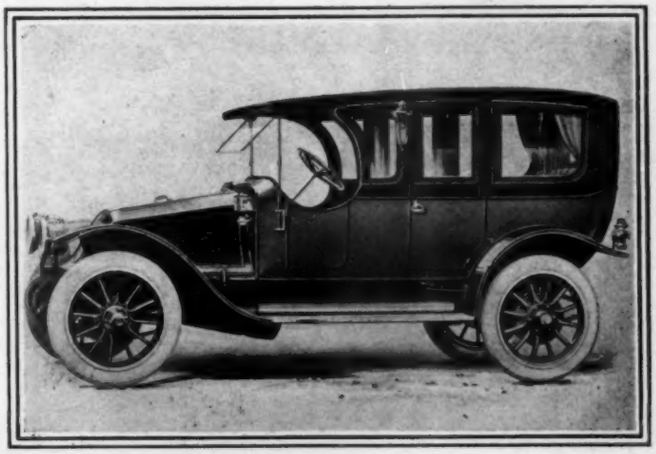


Fig. 8.—The Franklin seven-passenger limousine with full equipment throughout

Tesla's New Mechanical Principle

Wide Field for Efficiency Increase in Motor Practice

AN engine which uses gasoline as a fuel and is capable of delivering 60 per cent. of the inherent energy of this fuel at the crankshaft instead of the customary 18 to 22 per cent. has been invented and constructed by Nikola Tesla.

"It is well known," states the inventor, "that a fluid possesses, among others, two salient properties: adhesion and viscosity. Owing to these a body propelled through such a medium encounters a peculiar impediment known as lateral or skin resistance, which is two-fold, one arising from the shock of the fluid against the asperities of the solid substance, the other from internal forces opposing molecular separation. As an inevitable consequence a certain amount of the fluid is dragged along by the moving body; conversely, if the body be placed in a fluid in motion, for the same reasons, it is impelled in the direction of movement."

Based on these observations, Nikola Tesla, the discoverer of the polyphase alternating current, has developed a new mechanical principle broadly applicable for the generation, transformation and transmission of mechanical energy. The machines constructed by Mr. Tesla are illustrated herewith, partly by photographic reproductions and partly by sectional drawings which accompanied Mr. Tesla's original treatise in the *Electrical Review and Western Electrician*, September 9.

Fig. 1—110-horsepower steam-gasolene engine, weighing 20 pounds.
Fig. 2—Shaft and runner of engine

In the development of his machines it has been the aim of the inventor to let the energated fluid *flow along its natural paths;* that is, those of least resistance, with as small a friction loss as possible. It is important to keep in mind the fact that in his, like in all other mechanical devices, *friction is inevitably equivalent to a loss in efficiency.* With these points in view Mr. Tesla uses in his construction but a few simple and economic elements creating as little resistance as possible for the fluids moving his machine or moved by them.

The machine, Fig. 1, is of simple construction and may be used as a motor or as a pump. In a steel housing, very much like to that of a centrifugal pump, is contained a runner consisting of a number of steel or bronze plates arranged in series upon a shaft, Fig. 2. Each plate or disc has three central openings A extending from the shaft to about one-third of the radius and separated by spokes. These openings are cut or stamped out of the discs and the surfaces of the latter are kept as smooth as possible.

If the device, Fig. 2, is mounted on bearings and rotated at considerable speed the following phenomenon takes place. The air, in direct touch with the metal discs, is held to them by molecular adhesion, clinging to the metal surfaces as water does to that of a solid it is brought in contact with, and therefore the air particles next to the discs are imparted motion in the direction of the rotation of the discs. Thus, some air is dragged along and its particles begin revolving about the shaft of the device. Since the movement of the air is rotary, centrifugal force causes it to move away from the central portions of the discs, the resultant between the rotary and centrifugal force being along a spiral line. This flow of air toward the periphery of the discs causes a fall of atmospheric pressure at the central regions, and these being occupied by the openings, air rushes in through the openings, and thus a continuous flow of air is maintained.

If the discs are enclosed in the casing seen in Fig. 1, and the shaft is rotated, the unit will work as a pump. In order to explain the office of the inlet and outlet pipes seen in the illustration, Fig. 3, is offered to illustrate the Tesla pump in partial end view and vertical cross-section. The air adjacent to the discs is dragged along in the direction of the arrows, approaching at the same time the periphery of the discs. In addition to this the particles not in direct touch with the discs, but with the moving air, are dragged along and imparted motion through viscosity, that is, the attraction of the particles of a fluid. The viscosity of air is about 100 times that of water. Thus, the entire body of air between the two discs—unless they are spaced too far—is transported to the peripheral portions of the interdiscular space and, after having reached the periphery, streams along the wall of the casing, which widens from the point 1 to 2, 3 and 4, until the air reaches the outlet where it is discharged. The quantity of the fluid propelled through this pump, according to tests made by its inventor, is approximately proportionate to the active surface of the runner—the total active surfaces of all the discs on the shaft—and to the effective speed of the machines; therefore, the performance of the pump is bettered with increasing size and number of revolutions per minute.

The machine, Figs. 1 to 3, has twenty-five plates 9 3-4 inches in diameter, the entire runner being 2 inches thick and the full weight including the casing of the machine being 20 pounds.

If a fluid under pressure is permitted to enter the casing

through what is marked outlet, Fig. 3, it will flow along the wall of the casing, passing the points 4, 3, 2 and 1 in the order named until, when it reaches the narrowing near the outlet, which now is the inlet, it is forced to enter the interdiscular space. In doing this the adhesion of the discs to the fluid causes the former to have motion imparted to them, so that they begin to rotate, while the fluid, which is continually giving off energy, loses in velocity. Since bodies having rotary speed imparted to them are subject to a centrifugal effect, and bodies expending energy in creating rotary motion, to a centripetal one, the fluid with decreasing speed approaches the center of rotation, and is discharged dead, without pressure, through the central openings of the discs. It is exhausted by gravity through the opening marked inlet, Fig. 3.

The engine so described, when driven by a mixture of steam and the products of a gaseous fuel burned in an auxiliary chamber showed 110 horsepower on the brake, and more load could have been sustained by it except for the small dimensioned shaft. While this instance shows that the same machine may be used as a prime mover and as a pump, it is obvious that a machine of this type specially constructed for the purpose of driving machinery may be improved upon by adapting some details to the specific needs of the situation. Thus Fig. 4 shows a Tesla rotary engine, applicable for steam or hot-air drive, having a nozzle through which the pressure of the driving steam is increased. A reversing nozzle is also provided.

As in the other engine the runner is composed of discs D, having central openings O and spokes S. The discs are held in position, being keyed to shaft S1 which is mounted on suitable bearings. Washers W, conforming in shape to the spokes and riveted thereto, separate the discs. For simplicity's sake, only a small number of discs is shown, with proportionally larger intervening spaces than are used in practice. The runner is mounted in a casing having two end castings S with outlets E, stuffing boxes B and a central ring R1 bored out to a circle of diameter slightly in increase of that of the discs. The ring has flanged extensions with inlets into which nozzles N are inserted. Circular grooves G and labyrinth packings P are provided on the sides of the runner.

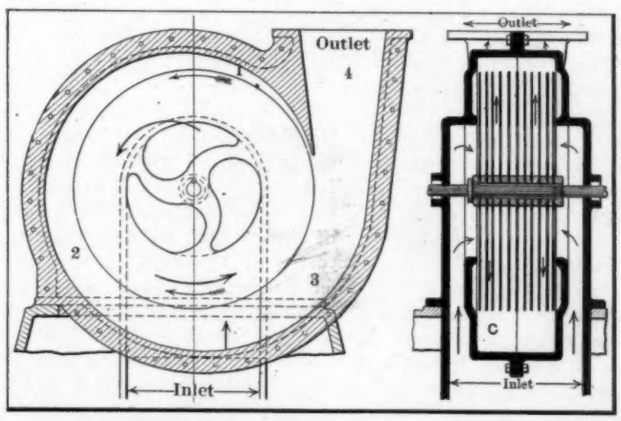


Fig. 3—Cross-section of Tesla rotary engine and pump

A steam engine of this type has been installed and tested at the Waterside station of the New York Edison Company. The runner consists of twenty-five discs, diameter 18 inches, the engine base being 20 by 25 inches, and the height 5 feet. This engine developed, with steam admitted at 125 pounds pressure and exhausted at 14.7 pounds, 200 horsepower at 9,000 revolutions. About 38 pounds of saturated steam were needed per horsepower-hour, but Mr. Tesla stated that by the use of moderately superheated steam and the ordinary vacuum the consumption may be reduced to about one-third of the quantity stated.

If the motor runs without load, the fluid which enters at the periphery completes a number of circles before it has expended all its energy and it leaves through the central openings. As soon as the load is put on, the paths of the fluid are cut short, being changed to a spiral with fewer turns. Despite the difficulty attending the work of determining the operating conditions in this machine, the following seems to be an established fact. The torque produced by the engine is directly proportional to the square of the velocity of the fluid relatively to the runner and to the effective area of the discs, and inversely to the distance between the individual discs. The maximum amount of work is done when the effective speed of the runner is one-half that of the entering fluid.

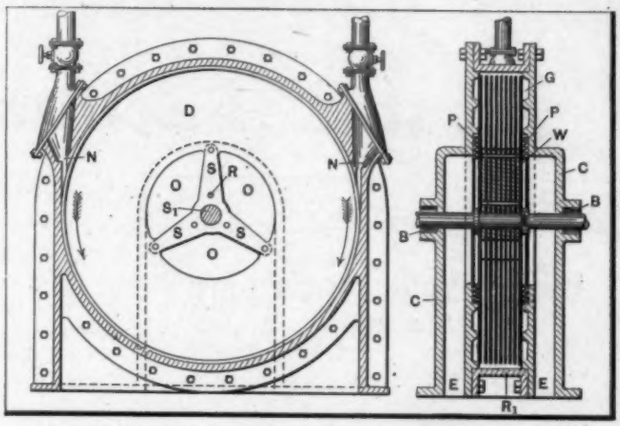


Fig. 4—Cross-section of Tesla engine for reversible steam drive

There is no unsurmountable difficulty in the construction of a light and practical motor of this type for the use of liquid hydrocarbon fuels. Of course, an auxiliary combustion chamber and carbureter have to be used in connection with the rotary engine described, and a very small pump to supply the air to the gasoline, if such be used. Mr. Tesla states that he has carried out numerous experiments along this line, and by the use of his motor transforms 60 per cent. of the energy of the gasoline into mechanical work available at the shaft. This may seem very high, but since with a rotary engine (compare steam engines and turbines) it is not necessary to encounter such vast cooling losses as in common gas engine practice, the high efficiency claimed by him might perhaps be obtained even in an average gasoline engine of his construction. It has been shown in THE AUTOMOBILE, July 27, 1911, pages 147-149, that the cooling losses in an automobile engine amount to 35.9 per cent., and the heat losses in the exhaust to 35.2 per cent. These heat losses together with other small expenditures of energies leave only 21.8 per cent. available at the motor shaft, that is, one-third of what is said to be recovered by an engine of the Tesla type.

The possibility of the enormous power output of Tesla engines in proportion to their weight may be understood when the great amount of active surface of these engines is considered. This fact also accounts to some extent for the large thermal efficiency. The 110-horsepower motor weighs 20 pounds, or 5.25 pounds per horsepower; the 200-horsepower engine at the Edison company's station weighs 400 pounds, or 2 pounds per horsepower, and by refinements of construction, the application of superheated steam and the use of vacuum exhaust Mr. Tesla expects to succeed in the building of an engine weighing 1-4 pound per horsepower.

A comparison between a Tesla pump and an ordinary pump may be of interest and not out of place here. In the laboratory of the inventor a small pump of the construction here illustrated is working. It is operated by a small electric motor, consuming 1-12 horsepower, and delivers 40 gallons per minute against a 9-foot head. The consumption of a good centrifugal pump rendering this work is about 1-3 horsepower, and in no case less than 1-4. This means one-third the power consumption for a given amount of work to be performed. As to the application of Mr. Tesla's principle to prime movers, it is stated by him that in large machines, by the use of superheated steam, high vacuum and the minimum of friction obtaining at these dimensions, about 95 per cent. of the fluid energy of the steam are delivered at the shaft.

System Facilitates Car Repairs

Complete Set of Cards Necessary in Handling Repair Work from the Time the Car Enters the Shop Until It Leaves

Peerless Motor Car Company
Test Report
Date Sept. 23 1911

R. O. No. 4316
Car No. 2795
Owner Dr. Ad. Fisher

Engine	Overheats at high speed. Backfire at advance of 20°.
Comm., Mag. Gov., Carbureter	rich mixture
Clutch and Clutch Couplings and Foot Pedals	O.K.
Transmission and Gear Shifting Levers	noisy on second
Steering Gear Fore and Aft Rods	O.K.
Universal Joints and Prop. Shafts	O.K.
Distance Rods, Torque Rods	O.K.
Diff. and Pinions	O.K.
Water Pump	test for high speed
Oilers	gives too much oil
Dash and all Wires	O.K.
Spark Advance	O.K.
Front Axle and Steering Joints	trace of play at sector
Emergency Brakes and Foot Brakes	foot brake slips for about ½ a foot
All Wheels	O.K.
Starting Crank	O.K.

Signed Frank T. Dawson Tester

Fig. 1.—Preliminary test report

CHARGE ALL LABOR AND MATERIAL TO
R. O. No. 4316

DETAIL OF LABOR TO BE PERFORMED

Look over engine for carbon; valves. Adjust carbureter. Look over & repair change-speed set, expec. 2d speed. Adjust oiler. Test water pump thoroughly & adjust. Look for radiator leaks. Eliminate play at steering gear. Adjust service brakes.

Repaint hood & mudguards.
Repair upholstery on rear seat.
J. A. B.

Fig. 2.—Repair order sent to shop

GRANTING that speed of execution is a very desirable factor in shop operation, practice has demonstrated that only a thorough training of the workmen and systematic regulation of their operations will make the attainment of this end possible. Just as the half-dozen men serving a gun on a battleship must move rapidly and each man unfailingly fill his office, without ever colliding with his neighbor, so success in the operation of a large machine or repair shop is impossible without systematically directing the operation of every man engaged in a place of work. Moreover, the men must become accustomed to the system, so that after habit has become second nature with them, more and better results are obtained without increasing their efforts.

Division of labor is the key to efficiency and speed increase. According to this principle, an automobile turned over to the repair shop for complete repairs of the broken or damaged parts is submitted to a series of operations, each being performed by a man or men specially adapted for their work through experience along that specific line.

The manner in which repairs are handled by the Peerless Company, 1758 Broadway, New York City, is described. The system used has been worked out to minute details in many respects, but no trouble is being experienced in making the force utilize the system to advantage. The case here treated is that of Dr. Ad. Fisher's automobile, No. 2795, which he ordered to be put in good working order.

Although the owner specified some of the trouble which he noted on his car during its recent operation, the car after being turned over to the Peerless people was taken by the tester and given some 20 miles of road test. This developed all the symptoms written on the card, Fig. 1. The tester or his assistant made a note of all the suspicious points in the behavior of the car, and when machine and operator returned to the shop the test report, Fig. 1, was filled out. The troubles discovered in the engine, carbureter and gearbox were noted concisely, not forgetting the troubles of water pump and oiler. Dawson, the tester, after finishing and signing this report, handed it to the superintendent of the repair department to whom he turned over the automobile at the same time.

The superintendent then drew up the repair order, Fig. 2, No. 4316, and attached it to the steering wheel. The car was delivered to the machine shop, and before any of the real work was started upon it all the accessories were taken off and checked in by a boy, who placed them in a locker. This operation was described in detail in THE AUTOMOBILE, issue of November 23, page 914. Each accessory was provided with a small tag, Fig. 3, on which the repair order number, the number of the car and the owner's name appeared. Then the machine was turned over to the workers for overhauling. The men doing this work strictly adhered to the orders specified on card, Fig. 2, and checked by means of their service cards, one of which is shown in Fig. 4. This card is that of the man who took charge of the repair work after the engine had been cleaned and tuned up. The worker's name was entered on the upper left corner, and under Description of Work all the items were stated, which went to fill the time that he spent on the job. The order number of the repair which occupied him was the same, No. 4316, on all the items appearing on his card. To fix the time spent on each card, it was punched under Job Time. Two lines' space were given to each item of work, and on the upper line, marked A, the starting time was marked by means of a time punch, while the finishing time was noted on the next line under O. The interval between the two times was entered under Payroll Hours. If all the work were done during the regular working hours, the hours and minutes taken up by each job would have been entered under heading Regular Hours. It took J. H. Brown 1 hour and 8 minutes to adjust the carbureter, while the inspection and repair of the transmission took 3 hours 27 minutes. Time spent on testing and adjusting oil and water pumps amounted to 2 hours 42 minutes. Brown started the job when he came in in the morning, but Time came on before he had finished the radiator test, and since the car overhaul should be finished on that same day, he had to put in overtime on it, which amounted to 1 hour 50 minutes, 10 minutes being spent on the radiator and the rest as marked.

Having finished his share of work on the car, he turned the automobile and his own card over to the foreman of the machine shop, who then attached the card, Fig. 5, and sent it on to the paint shop. Work was done in the paint shop on the following day, and after the newly painted sections had dried, the automobile traveled to the trimming shop. Both in the paint and trim shop the workmen used a card identical to Fig. 4, and when they were through with their work the complete card, Fig. 5, was signed by their respective foreman and then turned over to the superintendent.

The office of the repair department is kept in a corner of the machine shop, and after everything ordered by the superintendent had been done, the car was returned to him after the accessories had been attached. At the same time the superintendent received a blue sheet adapted to fit into a binder. On this sheet the whole history of the car in the shop was entered, together with a record of labor and material used on it. The other cards were kept on file in the shop office. From the blue sheet the bill was drafted in the office, which was later on handed to the customer together with his car.

However, before the machine was delivered to its owner it was given a still more thorough road test than the one it received before entering the shop. The tester was not the same as in the preliminary test. If the same man had been on the job he would have kept a very sharp lookout for the troubles he formerly discovered, and if anything had not been repaired to his satisfaction he would have turned the car back to the shop. On the other hand, the man conducting the preliminary test might have overlooked some trouble or other which another man might have discovered in a final test. Dr. Fisher's car was found all right by the final tester, who signed his name to the card before delivering it to the superintendent. The superintendent put the final O. K. on the card, which stated that the automobile was in good shape and ready to be delivered to its owner.

This system, embracing quite a number of cards, is not complicated. Every man writes out but one card at most, passing it on to the next man, until everything comes back to a foreman or superintendent. By having everybody trained to the system, the Peerless company has succeeded in conducting its repair department on a very efficient basis and in satisfying its New York clientèle, both as far as the speed and quality of the repair work done are concerned.

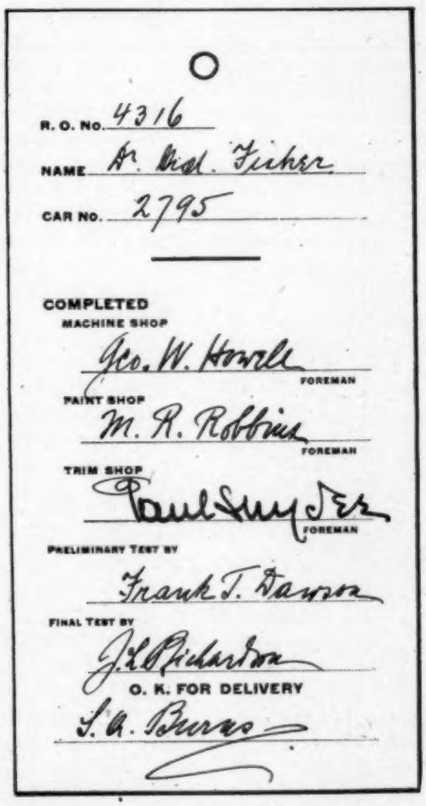


Fig. 5.—Every department chief signs this card after car leaves his hands

Harking Back a Decade

FROM *The Motor Review*, November 28, 1901:

At the race meeting held at Oakley track, Cincinnati, on Monday, R. Meyer won both events for gasoline cars. He defeated Max Fleischmann and Carl G. Fisher in one and Carl G. Fisher and H. W. Summer in the other. The best time he made in a 5-mile event was 8:32 3-4.

The following officers have been elected by the N. A. A. M.; S. T. Davis, Jr., president; E. P. Wells, secretary; Percy Owen, treasurer; A. L. Riker, first vice-president; C. J. Field, second vice-president; D. E. Rianhard, third vice-president.

Ralph Temple, of Chicago, has added the White Steamer and the United States Long Distance automobiles to his line, which already contains the Oldsmobile and National Electric. Temple's establishment is the largest in the city of Chicago.

C. B. Shanks is confident that he will succeed in driving a Winton automobile from the Atlantic to the Pacific next Summer, despite the obstacles that have stood in the way of such a feat. He will carry a letter from General Shafter to General Miles.

A station for the sale and care of Oldsmobiles exclusively has been opened at 138 West Thirty-eighth street, New York. The first shipment of forty cars is expected to reach New York next week. Its full allotment is 1,000 cars. R. M. Owen is in charge.

George N. Kendall, a retired manufacturer of Orange, Mass., has driven his Grout car for the past season, making 1,001 miles all told. Mr. Kendall says he never drives faster than 8 miles an hour and that the total cost of operation has been $15, or 1 1-2 cents a mile. Mr. Kendall says that if others would use their cars as he does there would be fewer frightened horses and accidents.

Milwaukee, a city of 300,000 inhabitants, has only a single automobile store. This is the Oldsmobile branch.

Automobile exports for the week ending November 20, from New York, amounted to $22,500.

Peoria, Ill., has passed an ordinance barring automobiles from the public parks of that municipality.

The projected race from Paris to Vienna now seems to be a certainty for next year. Objections to passing through Alsace-Lorraine have been made by some of the prospective French entrants and the route will likely be through Switzerland.

Peerless Motor Car Company
New York
Accessory Locker Dept.
Repair Order No. 4316
Car No. 2795
Car Owner A. Ad. Fisher

Fig. 3.—Tag attached to accessories removed from a car

J. H. Brown — ORDER NUMBER — DATE Sept. 24-11

DESCRIPTION OF WORK	ORDER NUMBER	PAYROLL HOURS REG.	PAYROLL HOURS O. T.	JOB TIME
Adjust carburetor	4316	1:08		A 0
Inspect + work on transm.	4316	0:27		
Oiler + water pump	4316	2:42		
Test radiator	4316	0:53	0:10	
Test, disassemble + adjust steering gear and brakes	4316		1:40	

Fig. 4.—Workman's card on which time spent on each job is noted

Digest of the Leading Foreign Papers

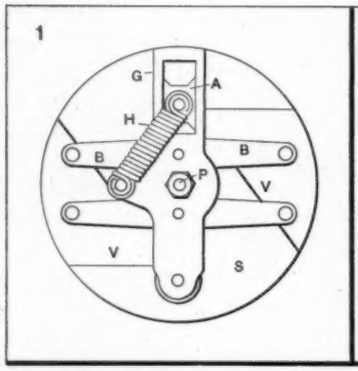


Fig. 1.—Timing the break of primary current

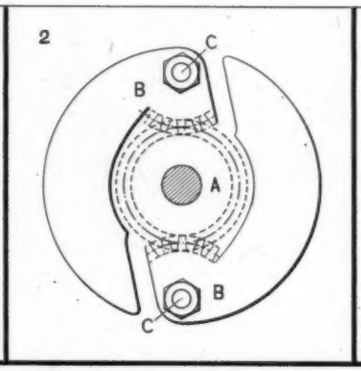


Fig. 2.—Turning armature by swinging weights

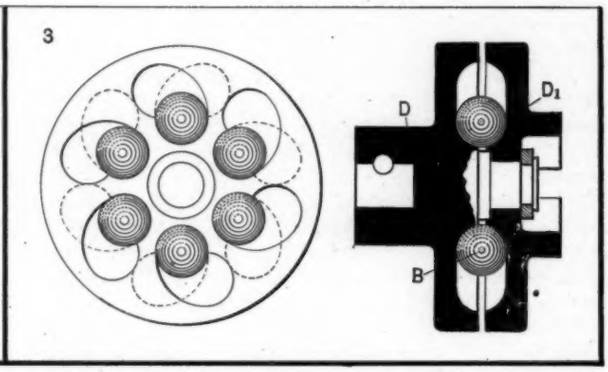


Fig. 3—Curved sockets in multiple ball coupling of the Ruthardt Magneto

Automatic Magneto Timing

ENGINEER A. BERGER of Berlin gave a synopsis of the methods employed by various magneto makers to effect automatic advancement of the spark and thus dispense with the timing lever on the steering wheel. The observations refer to the ignition apparatuses exhibited at the recent automobile exhibition in Berlin.

The recent improvements in automatic spark timing may be ascribed to the strong competition among manufacturers of ignition devices and the necessity for appealing to the convenience of the automobile owner in the sale of their products. The centrifugality of rotary masses is the force employed by all to bring about a change in the timing. Unterberg and Helmle change only the time for breaking the primary current. The diametrical piece G, Fig. 1, which rotates with the armature shaft, carries the platinum contact P and is formed with a radial slide in which the centrifugal mass A works against the resistance of the helical spring H. The leaf spring B pulls the back of the mass toward the stationary plate S. If the mass passes the cutouts V in this plate, the platinum points come for a moment in contact under the influence of the leaf spring B. But the edges of the cutouts, which determine the interruption of the primary current, do not extend radially but at a suitable angle, and ignition therefore takes place so much earlier, the farther the centrifugal mass is removed from the center of the device.

In all other magnetos it is the position of the armature, with interrupter, in relation to the drive shaft of the magneto, which is adjusted. In the Bosch and Eisemann apparatuses the required movement is, as well known, effected by relatively large centrifugal weights causing a sleeve to slide outward on a high-pitch thread, offering an increasing resistance in the direction of rotation.

In the Mea apparatus a small spurwheel A, Fig. 2, upon the drive-shaft meshes with teeth D on the centrifugal weight BB, so that the latter when swinging around spindles C advance the armature shaft with which they rotate. The irregular back pressures arising from the inequalities in the armature drag are not in this case, as in the other constructions referred to, counteracted by any special provision for automatic brake action, but are absorbed in the inertia of the masses. On the other hand, it may be mentioned as an advantage that the resistance of the armature at starting of the motor assists the retaining springs for the centrifugal masses in producing a late spark.

The Ruthardt construction, Fig. 3, is notable for being applicable to any magneto, being placed in the market as a separate coupling between the drive-shaft and the armature shaft. A disk D fixed upon the armature shaft which is swiveled in the drive-shaft is driven by means of a disk D^1 similarly secured to the latter, the driving connection consisting of six steel balls B placed in curved grooves formed in the disks. These grooves are of opposite curvature, when the device is assembled, as indicated by the dotted lines. The driving resistance tends to wedge the balls into the position nearest the center, and centrifugal action, in pressing them outwardly, advances the relative position of the driven disk so as to make foom for the balls

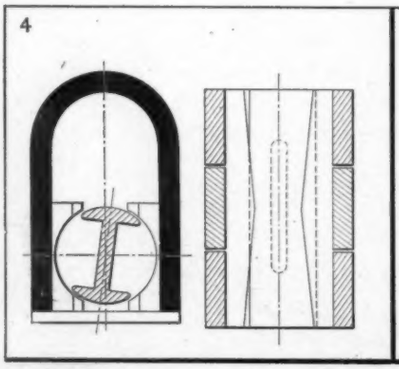


Fig. 4.—Larger ignition angle by re-designed pole pieces

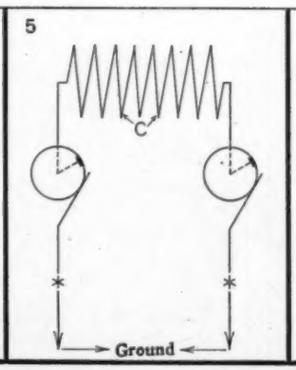


Fig. 5.—Wiring for duplicate spark

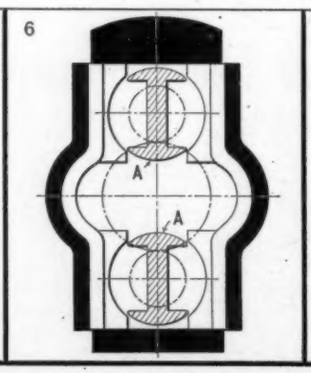


Fig. 6.—Two magnetos on one base

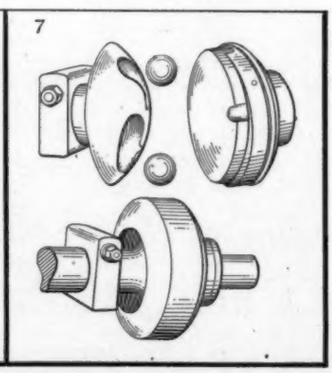


Fig. 7.—Variation of multiple ball coupling

farther out in the grooves. The coupling may be either horizontal or vertical, as in a vertical position of the discs the tendency of the lower balls to take a more circumferential position by reason of their own weight will be counteracted by that of the upper balls to seek the center except perhaps at the start.

A very similar device, but in which one disc is convex and the other hollow, was brought out at the Olympia show in connection with the Simms magneto. This is illustrated in Fig. 7, the upper part showing the coupling in assembly.

Timing by changing the relations between motor and armature shafts has the advantage that the position of the armature giving the highest potential is always utilized, no matter how much the spark is advanced. And this advantage applies also when it is the magnet which is turned with relation to the armature shaft for the same purpose, as in the Mea device whose horizontal bell-shaped magnet is particularly adapted for applying the principle in this form, though it is done by hand from the steering wheel. And in this apparatus the designer has also succeeded in developing the polar masses so that the lines of force produce a maximum in the induced current for such a large arc of the armature circle that an early and a late spark are of almost equal intensity.

Eisemann exhibited magnetos with pole pieces whose contours in the longitudinal extension of the apparatus do not show a straight but a broken line, Fig. 4, and has reached usable angles of displacement up to 150 degrees. The same is said to have been accomplished by Bosch. It is at all events notable that strong sparks are produced at relatively very slow motor speeds at any position of the timing lever, and also that the well-known intermittent resistance of the armature is much less pronounced than in earlier types of magnetos.

Two innovations of more recent origin vie with one another: the two-spark and the twin-spark or dual-ignition devices. The two-spark magneto is applicable especially where it is of importance to effect a rapid combustion of the mixture in a broad combustion chamber, such as T-head cylinders. Unlike the twin-sparker it effects the ignition at exactly the same moment at the two plugs. The principle, as shown in the Bosch and the Mea exhibits, rests on placing the two plugs of a cylinder in series. As the two plugs have only one insulated pole both ends of the induction current are insulated and are led to separate distributors, or to one combination commutator. Fig. 5 shows a diagram of the current distribution. Short-circuiting in one plug from fouling or faulty insulation causes only a stronger spark in the other plug. A switch permits the driver to close one of the circuits and continue working with the other. While a plug failure with this system cannot break down the ignition, a defect in the magneto will on the other hand incapacitate both plugs and with this in view Eisemann and Fein built twin-spark or dual-ignition devices.

Eisemann simply mounts two normal magnetos on one base and drives the two armature shafts, each carrying a spurwheel, from a third spurwheel in mesh with both of them and places the spark-timing device on the shaft of the latter. The Fein construction, on the other hand, represents a combination of two devices in one, Fig. 6. Two armatures A, two commutators and two interrupters form independent sets both served, however, from the same magnetos. The spurwheel whose spindle carries both commutators on opposite sides of the machine, serves to couple the armatures, so that only one more spurwheel is required than in an ordinary single-acting induction machine. An advantage over the Eisemann construction lies in the fact that the base provided for a simple magneto suffices also and as well for the dual device.

The dual devices are useful for other purposes than double ignition. By displacing one of the two armatures 90 degrees there is obtained an ignition apparatus for an eight-cylinder motor and one operating with only one-half the number of revolutions required for an ordinary eight-cylinder magneto. Similarly the construction may be applied to V-motors and fan-spread motors without inadvisable increase of the speed, and the failure of an interrupter in that case puts only one-half of the number of cylinders out of commission. Finally, a combination of single-spark ignition and a direct-current dynamo is possible with this type of apparatus, and the dynamo can be used for charging storage batteries for lighting and other purposes.

Battery ignition is, of course, not contemplated by the manufacturers of magnetos, except for double ignition with utilization of the same plugs and the same high-tension commutators for both ignition methods. By incorporating in the magneto a special wipe-spark device for the battery ignition, the two sparking systems can be rendered independent, in case one of the interrupters should fail.

The coil on the dash, which ordinarily works without vibrator, is in the Bosch construction provided with a vibrator which can be switched in by means of a push button for the purpose of starting the motor from the battery current. Eisemann has for the same purpose a current-breaking ratchet device turned by a small crank.

A starting arrangement enabling the driver to utilize the magneto coil to generate the starting spark was exhibited by Unterberg & Helmle in operation on a car, but the author was unable to examine it closely. Apparently the plan is to accelerate the armature suddenly by means of a lever mounted on the dash, and in addition there is a little steel bottle screwed into the combustion chamber of each cylinder. This is filled with combustible mixture from a compression stroke while the motor is working, and the mixture is released by the same crank lever movement which accelerates the armature, so as to turn the motor over even if no good mixture is otherwise at hand in the cylinders.—From *Der Motorwagen*, October 31.

Market Conditions in Italy

Of the three large Italian automobile factories, the Fiat, the Itala and the Isotta-Fraschini, the two first named send the larger portion of their production abroad, mostly to other Romanic people, and the large number of Renault and English Daimler cars seen in the streets of Milan and other large cities shows that the strong national feeling among the Italians still leaves room for imports from foreign countries in the large and expensive types of cars. The Spa, the Scat, the Lancia and the Nazarro factories, where smaller cars are produced on a limited scale, are not yet in a position to build "in series" and pay duty on many construction parts imported from Germany. It should be possible to import a great many small cars, as such a sales-field as that of the physicians is uncultivated.

There is no dealers' class, in the ordinary sense of the word, in Italy, with very few exceptions. In Milan and Turin the purchaser goes direct to the factory, and a few customers doubtless make trips to these cities for the purpose of purchasing, but ordinarily the Italian will not go to this trouble. He goes to the garage owner and orders a car as he would a suit of clothes from a tailor. The garage man has a number of different makes on hand and catalogs of many others. An importer would probably find it needful to establish salesrooms with stock in Milan and Rome and to build up a sales organization from these centers.

Cabs and specially built public motor vehicles are not numerous in Italy, and the livery work is done mostly with old second-hand private cars, which are expensive to run and inelegant in appearance. And yet the populace of northern Italy loves dearly to ride in a real motor-cab and greatly appreciates elegance in lines and colors of the carriage body.

Italians are perhaps a little less patient about repairs than other nationalities, and stocks of repair parts are a necessity for holding and expanding any trade established in an imported model. They like to do all their dealing with one firm, and an importer will therefore find it of advantage to handle a suitable variety of tires and accessories, possibly in connection with a garage of his own—*Allgemeine Automobil Zeitung*, October 27.

Letters Answered and Discussed

Trouble with Valve Action

Editor THE AUTOMOBILE:

[2,927]—In making repairs on a car having a valve action as represented in Figs. 1 and 2 where F is the fibre insert; S, set screw; B, bushing; and camshaft C I am at loss to account for the excessive amount of noise emanating from this mechanism. The car has run but a few hundred miles, and though the motor was very quiet when new, it is now decidedly noisy. I am sure the seat of trouble is in the valve action, as a cushion inserted between the valve stem and the tappets stills the clatter.

The only wear I have been able to find

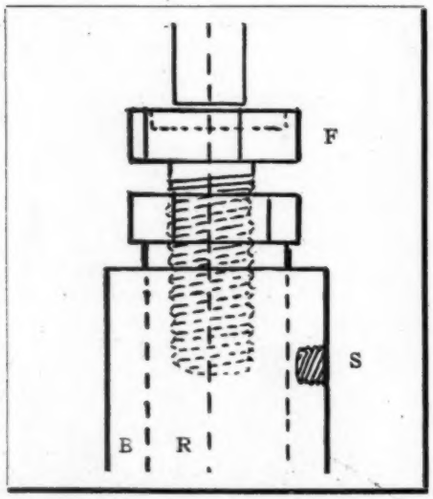


Fig. 1—Upper part of valve pushrod showing manner of adjustment

is as shown in the sketch—on lower end of the pushrod, where it bears on the cam. All of the right pushrods show this wear, which is barely more than 1-16 inch wide.

Would wear in this position, and of this dimension, cause the noise that is present? If so a remedy is obvious in regrinding and again casehardening the end of the push rod R, but as this would be no more permanent than originally I have considered the advisability of substituting a mushroom pushrod without changing the contour of the cams.

I realize this would greatly change the movement of the valve in relation to the position of the piston, causing a quicker opening after leaving the seat and holding the valve in the full open position for a longer interval.

I can see nothing detrimental to the function of parts by incorporating this change and I anticipate a benefit in eliminating much of the side-thrust on the pushrod and obviating wear on the lower end by spreading the wear out over a larger surface. Please tell me if this would be deleterious in the handling of the gases, and if impractical, why.

Does the pushrod bear on the cam during the closing of valve, or does the cam move faster than the spring returns the valve to its seat, when motor is turning above 1,500 R.P.M. SUBSCRIBER.

Northampton, Mass.

The noise you complain of is caused, no doubt, by the wear on the bottom of the pushrods. By screwing upon the adjustment nut located on the tappet rod, the lost motion due to wear will be compensated for, and the noise will cease. It would not be necessary to make the complicated repairs you suggest. The spring action is faster than the camshaft action, hence the pushrod bears on the cam.

The Editor invites subscribers to communicate their automobile troubles and personal experiences, stating them clearly on one side of the paper. If the nature of the case permits, send a sketch, even if it be rough, in order to assist to a clearer understanding. Each communication will receive attention in the order of its receipt, if the writer's signature and address accompany it as an evidence of good faith. If the writer objects to the publication of his name, he may add a nom de plume.

Description of Rotary Engine

Editor THE AUTOMOBILE:

[2,928]—The rotary engine recently completed by Mr. Nikola Tesla weighing but 1 pound to the horsepower and being reversible seems to be likely to bring about enormous innovations in automobile practice, so far as motor construction is concerned, so that I hope you will look into the matter and publish such information as you think of interest. CORTLANDT DE P. FIELD.

Peekskill, N. Y.

The description desired may be found on other pages of this issue.

Wants to Know About New Motor

Editor THE AUTOMOBILE:

[2,929]—Do you know anything about the Tesla engine which has been heard of not a little of late? Is there anything in it, or is it only a pipe-dream?

If the engine is an accomplished fact, can you not and will you not give us a full description of it in THE AUTOMOBILE at an early date? Also your ideas as to its possibilities and probabilities of application to the automobile. E. ATWELL.

Mountain Dale, N. Y.

On pages 950 to 951 of this issue a detailed description of the Tesla motor is given. We would call attention to the fact that the data contained in that report are the digest of actual experience.

Avoiding Freezing

Editor THE AUTOMOBILE:

[2,930]—This is the season when antifreezing solutions are in the mind of most operators of automobiles in the North. A great deal can be said for and against many of the preparations now on the market, judging from the literature circulated by the various manufacturing concerns. Will you kindly tell your readers through your answers to inquiries what you consider is the best preparation either on the market in commercial form, or which can be compounded by the autoist himself. The question may have been answered before

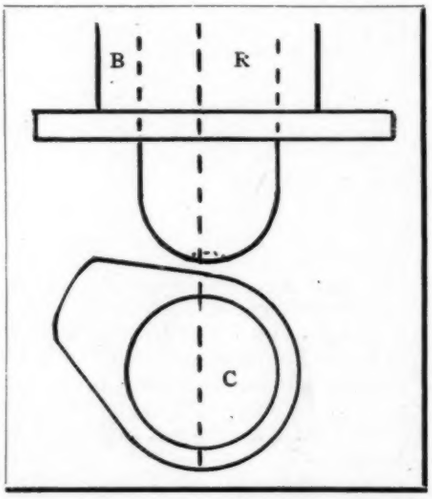


Fig. 2—Lower part of pushrod and cam. Dotted line shows wear on end of rod

but I am sure a repetition will interest a great many others. H. D. MARTIN.

New York City.

The following is recommended by the Thomas company and expresses the ideas generally held at the present date:

A mixture of 25 per cent. of denatured alcohol, which costs the same as wood alcohol but is superior to it for the purposes required, will prevent freezing at almost any temperature we may have here. The drawback to this is the evaporation of the alcohol, and as the boiling point of the alcohol is much lower than water there is a liability of the motor overheating if the weather gets warm.

We have also used a solution of 15 to

20 per cent glycerine with good results, which will prevent freezing to 5 degrees below zero, and has the advantage of not evaporating, but it is open to the objection that on account of the presence of stearic acid in the commercial forms of glycerine it has an injurious effect of decaying rubber hose connections very rapidly, and occasionally bothers the driver by clogging the strainer of the water-pump.

We suggest that the radiator be protected by a leather shield covering one-third of the lower radiator surface, which makes the motor work very much better in cold weather, and also protects the carburetor, keeping the cold blasts of air from passing through the radiator. An excellent protection will be an asbestos board as this is a non-conductor of heat as well as cold. Either the leather or asbestos may be fastened with copper wire.

The method most in vogue with chauffeurs is to throw a robe over the front. Many use chloride of calcium or other solutions where it is necessary to depend upon a dissolving of chemicals, but there is a serious drawback in doing this, owing to the fact that the evaporation of water causes the chemical to precipitate, and in time forms a crust or coating in the water jacket of the cylinders, thereby reducing the cooling efficiency of the cylinders.

If it is ever necessary to have the non-freezing solution which you use during the Winter months drawn out of the radi-

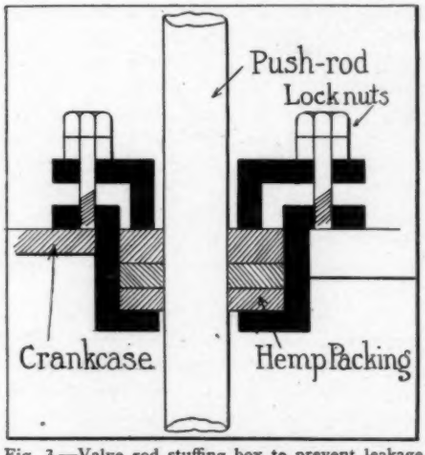


Fig. 3.—Valve rod stuffing box to prevent leakage of oil from crankcase.

ator, do not forget to personally see that it is replaced, for in many instances we have known of the solution being discarded through an oversight and water put back in its place.

Oil Leaks from Crankcase

Editor THE AUTOMOBILE:

[2,931]—Being a subscriber to THE AUTOMOBILE I take the liberty of asking if there is any simple method of preventing the leakage of oil about the valvelifter cages, as these cages become worn a short time after renewing. D. T. DUKE.

Wellsville, N. Y.

The only method which can be used with success is the installation of a stuffing-box. This will have to be done by a regular repairman as it will be necessary to drill and tap the crankcase in order to take any of the standard types. A good form of stuffing-box is shown by Fig. 3.

Truck Statistics

Editor THE AUTOMOBILE:

[2,932]—I wish to ask your opinion as to the probable number of commercial vehicles of all kinds in use at present in the United States. Also, your opinion as to the probable total number of commercial vehicles being produced yearly at the present time. L. B. GAYLOR.

Stamford, Conn.

As near as can be judged, there are over 10,000 motor-trucks operated in this country at the present time. According to the latest available census figures, the increase since 1909 in the number of these vehicles is about 7,000, there being 3,288 in use in that year. It is estimated that in the next 12 months there will be nearly 18,000 commercial cars manufactured.

Rust in Radiators

Editor THE AUTOMOBILE:

[2,933]—When putting my car up for the Winter and letting the water out of the radiator I notice that rust comes out with the water. I have wondered if it would not be all right to put in a quart or more of kerosene or other oil and stop if possible any further rusting. I would let the oil either remain in the radiator or drain it out after a time, or else I could put in a little wood alcohol or other non-freezing solution. I would very much like to have your opinion on this matter.

G. W. WILLARD.

Dundee, N. Y.

Probably the best method would be to fill the radiator with a good non-freezing solution, as rust action is very slow when air is not in direct contact with the metal A 50 per cent. solution of denatured alcohol and water will freeze at 35 degrees below zero and is very safe in most climates. Another good plan would be to run kerosene through the radiator two or three times. This should be done about once a month.

Wants Soldering Information

Editor THE AUTOMOBILE:

[2,934]—I am a constant reader of your publication, but I cannot remember seeing anything in your columns on the art of soldering. There seems to be a dearth of information on this subject and yet it is of great use to a man who takes care of his own car. The greatest trouble with most amateurs I find is the inability to keep the copper in good condition.

I have used sal ammoniac dissolved in water and have also rubbed the copper on a block of the same, but find that it eats the tin away. Is it not possible to get a high grade of copper which will hold the tin on the point without having frequently to retin it? Perhaps the quality of the sal ammoniac has something to do with it. I would be very pleased to have any information on the subject available. E. G.

Detroit, Mich.

With copper it would be better to use zinc chloride as a flux. If the copper is heated to redness at any time the tin will volatilize and retinning will be necessary. After dipping the copper into the chloride, the stick of tin is held against the surface and will be found to adhere until it is heated to the temperature of volatilization.

Effect of Alcohol on Carbon

Editor THE AUTOMOBILE:

[2,935]—Would you kindly tell me through the pages of THE AUTOMOBILE what effect denatured alcohol would have on

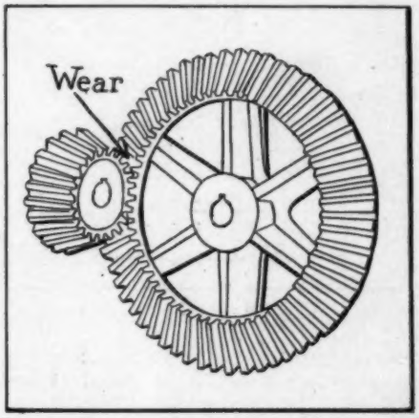


Fig. 4.—Showing the point at which wear and noise occur in the gears

the carbon in the cylinders if injected while the cylinders were hot? GEO. W.

Portland, Me.

It would have absolutely no effect whatever.

Slashing Transmission Gears

Editor THE AUTOMOBILE:

[2,936]—I have a five-passenger touring car of a prominent 1912 make, and find it very nice all around, except that when I change speeds I hear a strange noise in the gearbox. I believe it is lost motion. What can I do to quiet the noisy member?

Rockland, Me. R. H. WATERS.

While it is true, in a way, that all noise is caused by lost motion, the noise experienced by you is not classed in general under that heading. The teeth of one gear strike those of another which it is to engage. Despite the high-grade material used in transmission-gears this practice is very harmful, and in time will spoil a good set of gears. It is either evidence of poor design in a car, or of lack of skill on the part of the driver. Fig. 4. shows the point at which the wear occurs, and it is this wear which causes the noise in the gearbox.

Little Bits of Motor Wisdom

Tools and Other Devices Useful to Repairman and Driver

TROUBLES WITH BOLTS AND NUTS—Care should be taken in starting a nut that it does not get cross-threaded, as shown (exaggerated) at A, Fig. 1. This more often happens when the thread is fine. In any case it often means the replacement of either the nut or bolt, or both, and there is no need for its occurring at all, if the nut is not forced when it is a little bit askew. Often when the nut cannot be made to start on the thread as it should the trouble is due to the burring of the first thread, as at B. This burring usually results from striking the end of the bolt with a hammer. Whenever the use of the latter is necessary, a block of wood should be placed between it and the bolt head. When the end of a bolt is found to be burred in this manner, the trouble can be remedied by using a small file to rethread the damaged portion, first filing off the burr. Perhaps one of the worst mishaps is to twist off a bolt at some important point. This often results from trying to force the nut beyond the end of the thread when it is already against the shoulder, as at C. Sometimes the nut will split instead, if it is the weaker number, this being, of course, the lesser of the two evils. To prevent either from happening, place a washer or two over the bolt before putting on the nut, as shown at D. This is merely another ounce of prevention. When the thread is found to be poorly made in some such manner as is shown at E, the best thing to do is to run a thread-cutting die of the proper size, that is, having the same number of threads per inch as the bolt has, over the imperfect thread in order to reduce it in diameter near the shoulder. If the nut fits the smaller end, it will jam when screwed up farther, and will eventually either split or twist off. When the nut to be adjusted is rather inaccessible, there is no tool in the kit more handy than the socket-wrench, although some drivers do not include one in their equipment at all. Once they have to get at some hidden part at the lower end of the steering column, or at some other equally inaccessible point they will soon appreciate the need of such a tool.

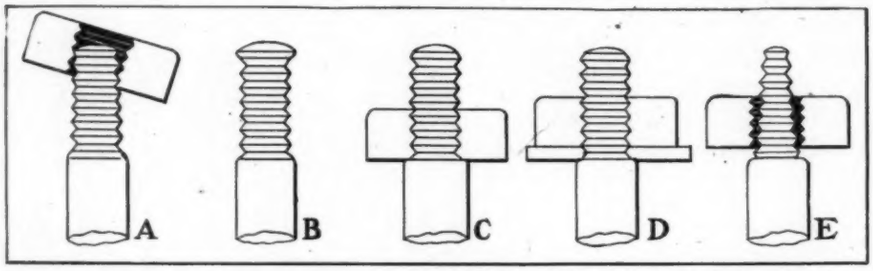


Fig. 1.—Illustrating the different ways in which threads are abused; also, defective thread

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RUST IS AN ENEMY OF TIRES.—Rust eats into rubber tires like lye. It is usually formed on the rims and then gets onto the envelopes of the tires near the beads. In time this rust will eat through the rubber and attack the canvas as well. It is best to remove the tires from the rims when this discoloration is noticed. Get the rust off the tires first, then take some heavy emery cloth and clean off the rim with it as well as possible. Next use some finer emery cloth and rub the rim until it is thoroughly free from the deposit and is smooth. If the rim is quite rough and uneven, first take a file and smooth it down before applying the coarse emery paper. After making the rim perfectly smooth rejapan it with one or two coats, and after this dries, rub it down again with the emery paper. This should entirely eliminate the rust, and make a smooth rim for the bead to fasten on, thus also doing away with the danger of tearing the latter every time the tire is removed. Another preventive of rust is flake graphite. To apply this to the rims, put on them a coat of shellac to which has been added enough graphite to form a thin paste. Graphite may also be used in the place of chalk or soapstone between the inner tube and the shoe. It is less injurious to the rubber, is more lasting, makes a good fit of the inner tube and reduces the heating. This, of course, refers to flake graphite.

THE ALLIGATOR WRENCH—It is often said that there is nothing new under the sun and this can certainly apply very readily to the tool known as the alligator-wrench. This useful article, while not exactly new, fills such a variety of purposes that it is worthy of more than a mere passing notice. The alligator-wrench which is illustrated in Fig. 2 consists of two fixed jaws which are serrated in the form of teeth and from which the wrench takes its name. It is more or less of a rough-and-ready tool inasmuch as when it becomes necessary to hit the work a few gentle taps it can readily be done with this wrench without grave danger that the tool will be greatly injured, as is the case with the more delicate monkey-wrench.

Many a good and useful wrench has been ruined through its misguided use as a hammer or mallet, and yet there are cases where it is not convenient to drop everything and secure a hammer when it seems that a couple of blows with the back of the wrench would readily do the work without further trouble. The alligator-wrench will fit any hexagonal nut sufficiently well to turn it to a reasonable degree of tightness. However, it must be remembered that this tool can be abused just the same as any other.

The chief objection to the alligator-wrench is that it is very apt to claw the corners off the nuts if it is used excessively. This is particularly true if great stress is put upon it, as in the case of tightening the nut, beyond the point where it will turn readily. That this should be true is readily apparent as it is a parallel case to using a wrench which is not an exact fit. In this case, if sufficient pressure is applied against the resistance to turning of the nut the corners will be stripped so that the hexagonal nut tends to take a round shape.

There are numerous instances where a wrench cannot be carried for every different-sized nut, and in this case the alligator-wrench is indispensable, for, owing to the long range in sizes of nuts which can be readily manipulated, provided they are not required to be tightened to too great an extent, there will rarely be a case which cannot be met with this form of wrench. In case the nut which has to be removed is rather tight, it is a very simple affair to strike it a few slanting blows with the wrench which will generally serve to

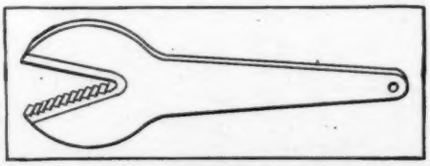

Fig. 2.—Showing an alligator-wrench which is often of use

loosen it to such an extent that the wrench may be applied for the complete removal of the fitting.

In case the nut which is to be removed will not loosen readily a method which is often successful is to apply the flame from a gasoline torch to the nut and then to gently tap the nut on one of the corners, being careful to apply the torch so that the flame is just on the nut. If no torch is available a little waste dipped in gasoline, wound about the nut and then lighted will do the work.

Oil Cans to Be Carried—The railroad engine driver with his rack of oil cans does not find a parallel in the driver of the modern automobile, so far as these instruments of lubrication are concerned, because the problem of accessibility is not only much more simple in the automobile but also because the problem has of late been given the attention it deserves and inaccessible spots are rapidly vanishing. The spectacle afforded in past years, of seeing the operator of a gaily painted automobile lying flat on his back in the middle of the road vainly tinkering with the mysterious and hidden secrets of the mechanism has all but vanished until in these days the search for trouble has resolved itself, for the most part, into a simple lifting of the bonnet.

It is the same thing in the way of reaching parts to be oiled. The oiling spots on the automobile are well defined and the schedule of oiling has been reduced to a basis of hours and quarts or in other cases to miles and quarts. The motor is always mechanically lubricated and once the oil is in the reservoir the operator need not bother about it until the level gauge indicates to him that the supply is running short and should be replenished. A small oil can will be of use to the automobile driver; in fact, two of them should be carried, with different-shaped nozzles, one for oil and the other for gasoline, as shown in Fig. 3. The gasoline should be carried in the can with the straight nozzle and the oil in the can with the curved nozzle. The gasoline will be found to be of a variety of uses such as priming the motor and cleaning the hands after working about the engine.

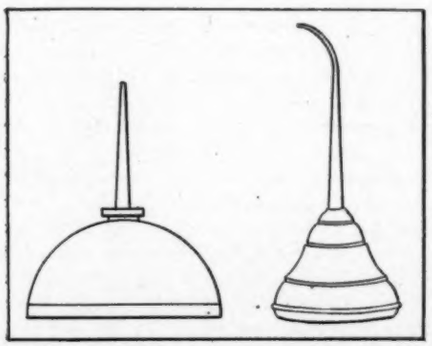

Fig. 3—Two oil cans may be carried for gasoline and oil

It will often be found advisable to put a drop or two of oil at different points, and the oil can will be found to be of the greatest convenience. There are several points which are beyond the classification of regular lubricating points, such as the compression cock handles, magneto and water pump bearings, etc. These require a few drops occasionally where they are not provided with grease cups. A grease gun is often of use in putting the lubricant in its proper place.

Using the Spanner Wrench—One of the most important tools in the kit is the spanner-wrench, yet it is capable of much damage to nuts and bolt-heads when improperly used. The number of cars to be seen in which there is tell-tale evidence that the owner or driver does not yet know how to properly manipulate the tool is surprising. This may be due as much to carelessness as to neglect, but nevertheless the burred nuts speak for themselves. Of course, these remarks apply principally to the adjustable spanner, the ordinary standard spanners not admitting of serious misuse, since they can be used only on the size nuts for which they were made. In using the spanner it is essential to get as firm a grip as possible on the sides of the nut. If improperly adjusted as shown at 1, Fig. 4, the corners of the nut are sure to be worn away, or badly burred, and, if the practice is continued, the nut soon becomes useless until new faces are made on it. This is true particularly of brass or bronze nuts, or others made of soft material. Another misuse is that of not putting the wrench far enough on the nut, as shown at 2. While this also tends to burr the corners of the nut, it spreads the jaws of the wrench and strains them so that when next applied to a nut, they will not fit accurately, as shown at 3. At 4, in Fig. 1, is shown the proper way to use the tool, the jaws being given as much bearing surface as possible on the faces of the nut. When adjusted in this way there is little danger of rendering impossible the removal of the nut after about the third time. Never apply too much force when tightening up a nut. It is possible to strip the thread, or, worse yet, to turn the end of the bolt off by using a heavy, long-handled wrench on a small nut. Few realize the enormous force which can be exerted by a long-handled wrench, even when the force applied is not very great. Another mistake is to use pliers for the adjusting of small nuts, such as those on the magneto or carbureter. A small spanner is far better for the purpose and should be used wherever possible. The ease with which these small nuts are burred makes it necessary to be very careful when applying even a spanner to them.

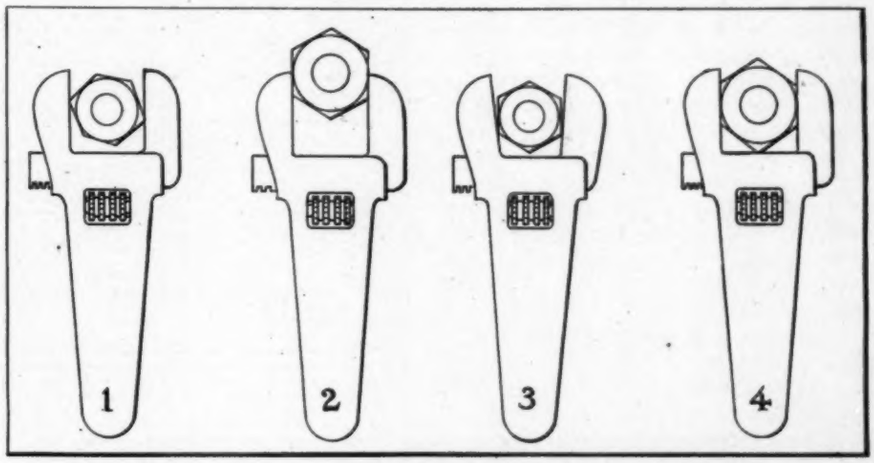

Fig. 4—Showing the use and misuse of an adjustable spanner-wrench

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Clean Differential Housings—It is occasionally necessary to remove the cover from the differential housing and give the contents of this casing a thorough cleaning and overhauling. If long life is desired in all parts of the motor, cleanliness will be the great means of securing it. In cleaning the differential housing the cover is removed and the casing flushed out with kerosene. The motor is then allowed to run for a few seconds and the casing again flushed out, after which it is refilled with the particular oil or grease recommended by the manufacturer. The casing is then screwed into place. There is generally a cock in the bottom of the differential housing through which the kerosene is drained before the housing is refilled.

In replacing the cover after putting in the grease, care should be taken in tightening up the screws that hold the cover in order not to turn off a head. When this happens, it is rather hard to get at this part of the car to remove the portion of the screw remaining in the tapped hole.

My Best Automobile Repair

Some Quick Repairs Made in the Garage and on the Road

A Gasoline Gauge

Editor THE AUTOMOBILE:

I read with interest the suggestions for repairs and of the improvements which others have made on their machines, and I am sending you a sketch showing a gasoline gauge which I have fitted to my tank, the latter being under the front seat. This has proven very satisfactory, and is inexpensive. If you deem it worth publishing, it may interest someone else. Fig. 1 shows the gauge D attached to tank A. Two 1-4-inch unions C are used, and the stop-cock B is included so that the gasoline may be shut off in case the glass breaks. A detail of the gauge proper is shown to the right. The brass caps E are tapped for a 3/16-inch brass rod F, which secures the 5-8-inch steam boiler gauge glass G. The pipe connections to the tank are shown at H. Leather washers should be placed at K to prevent leakage.

ELMER C. NORTH.

Juniata, Pa.

When the Gasoline Gives Out

Editor THE AUTOMOBILE:

"The gasoline tank is empty." What a hollow sound these words have if one is stranded a few score miles from home! But don't give up the ship. Just disconnect the tubing which supplies the acetylene gas to the headlights and insert it in the primary air intake of the carbureter, as shown in Fig. 2. Turn on the gas and adjust it so that the motor will run well at a moderate speed, and proceed on your homeward way. Of course, the speed of the engine cannot be controlled very well, because the supply of gas remains constant and does not vary with the suction as does the liquid gasoline. However, by proper manipulation of the spark lever, one may "get there."

MURRY FAHNESTOCK.

Allegheny, Pa.

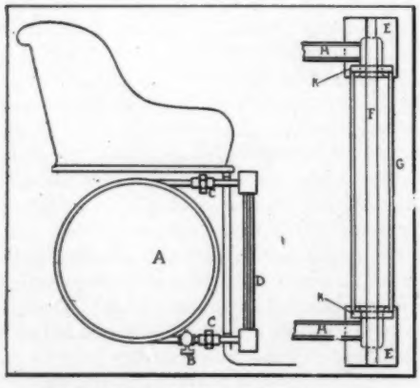

Fig. 1.—Suggested form of gasoline gauge

Temporary automobile repairs made by the driver or owner while on the road and permanent repairs made in the garage after the run is over, are interesting to all automobile owners.

It may be a spring leaf has broken; a shackle bolt or strap may break; a steering tie rod is bent; the car skids into a curb and bends a steering arm or the starting crank; a throttle or magneto connection breaks owing to vibration; a radiator leak is started by a stone or some other means; a leak in the gasoline tank is discovered; there is a small hole in the gasoline feed line; a brake facing may burn out; a brake connection breaks; a front axle gets slightly sprung; a clutch starts slipping, or any one of a thousand things may happen.

Every automobile owner is interested in knowing how repairs have been made, how long it took to make them, how much they cost, and by whom they were made.

We want you to write in simple language in a letter what repair of this nature you have had to make, how you made it, how long it took you and how much it cost.

You can make with your lead pencil one or two rough sketches indicating the broken or damaged part and showing how the repair was made.

The experience of each reader is interesting to every other reader. Analyze your past experiences and send in one or two of them.

Give your name and address, legibly written. If you do not want your name to appear, make use of a nom de plume.

Editor THE AUTOMOBILE.

That Tire Pump

Editor THE AUTOMOBILE:

Mr. Ed. C. Bates, in the October 26th issue, described a method of making a tire pump. I made one according to directions, I believe, but could not get any air into my tires. I have a two-cylinder motor, which perhaps runs too fast, and I cannot throttle it down as far as a four-cylinder motor. I would be greatly pleased to make this pump and would like to have further directions.

Atkinson, Ill. THEO MILLER.

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Editor THE AUTOMOBILE:

In your issue of October 26 there appeared an article which gave directions for making a tire pump and asking the opinions of readers on the contrivance. I would say that I have followed these instructions, using the pump on a four-cylinder engine with a bore and stroke of 4¼ inches by 4¼ inches, and the same will absolutely not work. It is only a waste of time and material to experiment with such a contrivance on an engine of this size.

Albany, N. Y. H. M.

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Editor THE AUTOMOBILE:

In the October 26th issue of THE AUTOMOBILE on page 728 is a sketch and description of a home-made tire pump, operated by screwing it into the engine cylinder in place of the spark-plug. I would like to know if such a pump would operate properly in connection with an L-head or a T-head motor. Would pure air or a mixture of gas and air be delivered to the tire, and, if any gas, approximately how much and what would its effects on the tire be? In addition to your direct answer, I would like to see replies from some users of such a device, either home-made or such types as are regularly for sale.

Pittsfield, N. H. WILLIAM B. ELY.

—

Has any reader constructed this pump and made it work satisfactorily? The suggestion and sketch were submitted by Mr. E. C. Bates, of Clarksville, Tenn., and while THE AUTOMOBILE has not actually constructed the apparatus, the idea appears to be reasonable, although perhaps rather impractical. If it will work at all, there is no reason why it will not operate equally well on either a T-head or an L-head type of cylinder, since it depends for its operation on the compressive force and not on the cylinder design. A mixture of gas and air would be delivered to the tire, but the amount of air in proportion to the amount of gas would no doubt be great enough to counterbalance any ill effects which the gas might possibly have. Perhaps Mr. Bates can explain why these correspondents have not been successful with his contrivance, and can give more light as to its construction and manner of operating.—EDITOR.

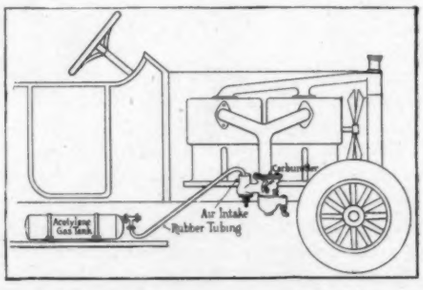

Fig. 2.—Emergency use of acetylene gas to run motor when gasoline supply is exhausted

My Ideal 1912 Automobile

Readers' Conceptions of What Next Year's Car Should Be

Perhaps You Are Right

Editor THE AUTOMOBILE:

In THE AUTOMOBILE for October 26 Mr. P. G. Tismer gives his idea of what a low-priced car should be. His is certainly a most desirable car. I would suggest, however, that besides doing away with the carbureter the engine should also be omitted, for even a single-cylinder engine is more or less complicated and I think that Mr. Tismer's car would run just as well without the engine. I am sure that it would coast better without this complication and the control would be greatly simplified, for even the spark advance and transmission could be done away with. I am glad to see that "mud guards and top are put in position when needed." I presume that these useful accessories are folded up somewhere in the body of the car and, if the driver should be unfortunate enough to encounter a rainstorm while out on the road, he would only need to pull them out, adjust them and bolt them on his car—a simpler operation, surely, than raising an umbrella.

BARRY MACNUTT.

South Bethlehem, Pa.

From a Racing Driver

Editor THE AUTOMOBILE:

I have been asked to state my ideas of what would be considered a first-class fool-proof automobile for the general public to own. By general public, I mean the people who own and run their own machines, and who have little or no knowledge of what is under the hood and footboards.

To start with, I would have a reinforced, pressed-steel frame. I have seen so many frames on good cars that would sag in the center or crack near the dashboard that I believe they should be reinforced in these places. The springs should be elliptic and should be of ample size to withstand the jar of the machine over rough roads without fear of breakage. I also believe there should be straps on the springs to eliminate the rebound, as it is not the contraction of the springs that breaks them, but the rebound.

The engine should have a bore of about 4 1-4 inches or 4 3-4 inches and a stroke of either 5 inches or 5 1-2 inches. The valves should be large, and the connecting-rods should be strong enough to withstand the power of the explosions. A good splash-feed oiling system that could be relied upon to do its duty at all times should be used.

Readers continue to demonstrate their interest in the ideal car and the specifications which are submitted show a wide range of taste and requirements. In view of the interest shown the Editor continues to extend the invitation to all who entertain ideas on this absorbing topic, to submit their opinions for publication. The description should be legibly written on one side of the paper and signed by the sender, although if it is so desired the name will not be published.

The engine should be strong and simple, and built so as to be easily accessible in case of emergency.

I would use a Remy magneto, which is simple and easy to adjust, also a model L Schebler carbureter, which is about as fool-proof as any carbureter made. The latter may use 5 cents' worth of gasoline more a month than some others, but it will always get you home.

A cone clutch with spring inserts gives one as much satisfaction as any other kind. It never runs dry of oil, and, with a little care, will give good satisfaction. A three-speed selective-type transmission made of good materials and of sufficient strength will prove satisfactory.

A full-floating, ball-bearing rear axle fitted with internal and external brakes would be desirable, and I would have 34-inch by 4-inch wheels. The B. & L. caster front axle would put the car under absolute control of the driver, would eliminate a great many accidents and would also leave the driver's arms and shoulders in a better condition at the end of the day's run. This axle makes the car 90 per cent. easier to control. I am a racing driver, and I believe that before long all the leading factories having racing teams will equip their cars with the B. & L. front axle, in order to insure their drivers' safety. Otherwise, there are so many drivers being killed that there will soon be a scarcity. Factories will have to insure their drivers' lives by putting this axle on their cars.

HARRY BUCKLEY.

Cars Good Enough as They Are

Editor THE AUTOMOBILE:

To my mind, several of the cars which are being shown for next year come as near to the ideal as we are apt to get with the knowledge which the automobile engineering fraternity has at its command at the present time. Some readers' opinions are so radically different from the actual models as produced by engineers who have had many times their experience, that they are freaks even on paper. The automobile of to-day has passed beyond the freak and experimental stage, and the better makes are as near to mechanical perfection as can be desired. Besides being correctly built mechanically, they are built so as to be a comfort and pleasure to the motorist. Accessories are placed in a particular place only after careful consideration as to their accessibility. Springs and shock absorbers have at last been constructed in such a way as to make easy riding the rule rather than the exception. Self-starting and electric lighting make it unnecessary for the driver to leave the car to light the lamps or to start the motor. In a word, the noisy makeshift cars of the past have been superseded by the silent, smooth-running machines of the present. No longer is the monster's approach heralded for several miles before it actually appears. The days of such nuisances are past and now we have gasoline cars which are equal to electrics without the latter's disadvantages of limited mileage and small capacity.

Therefore, why suggest radical changes, when if the wise manufacturers had deemed them necessary they would have long since been incorporated in the existing models?

The long-stroke motor has advantages which cannot be overlooked, so in my car I would specify this feature. I would require ample power so that I would not have to take the other fellow's dust or have to resort to the low gear to take me over steep hills. The motor would have six cylinders, as for smooth riding and easy running and for flexibility there is nothing, in my opinion, equal to the six. Flexibility cannot be too highly praised especially where the car is to be used in heavy city traffic. Any of the high-grade power plants would be acceptable, preferably one which had three-point suspension. The carbureter should have two jets, and there should be an auxiliary air valve, which could be adjusted from the seat.

I would want the latest type of body construction, with the control levers in the center of the car. With the prevailing types of fore-door models, there is scarcely room on the right side for these levers. This also admits of access to the driver's seat from the right side of the car.

Such a car as I have outlined could not be bought for a song, but would possibly cost anywhere from $3,500 to $5,000, although there are several worthy machines for 1912 at a much lower figure.

CHAS. E. HAMMOND.

Chicago, Ill.

Automobile Metallurgy Made Easy

By E. F. Lake

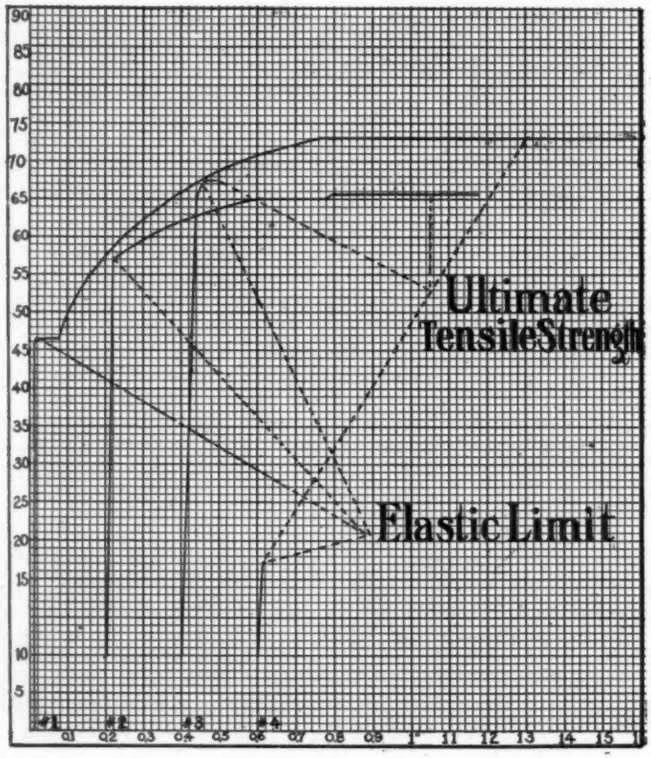

Fig. 1.—Chart showing tensile strength, elastic limit and elongation. No. 1, machinery steel; No. 2, cold-rolled steel; No. 3, brass; No. 4, cast iron.

Part II.
The Elastic Limit

Value of This Factor in Different Materials Entering Into the Automobile Make-Up—How Obtained and Why It Is Necessary

AFTER the tensile strength has been considered, the most important factor in the strength of metals is the elastic limit. In pulling test bars apart in the tensile testing machines, shown in Part I, they will stretch a certain distance and then spring back to their original length. When stretched a little further, however, a permanent set takes place and from this they will not spring back. The point between these two is called the elastic limit, *i. e.*, the limit of the elasticity of the metal.

The difference between the pounds pull required to make the metal first take this permanent set and that required to reach the ultimate tensile strength and break the specimen varies considerably with different metals. In pulling test bars apart a gradual rise in the number of pounds is shown by the scale beam from the time the pull is started until the elastic limit is reached. When the permanent set first takes place the scale beam halts, in its upward motion, for a fraction of a second and then shows a more gradual rise from this point until the limit of the tensile strength is reached and a break occurs. This is due to the metals stretching much more when the elastic limit is passed than they do before it has been reached.

With most tensile machines, such as are shown in Part I, on tensile strength, a chart is provided and on this is lined, with a stylographic pen, the action of the scale beam. A reproduction of such a chart is shown in Fig. 1. In this chart line 1 shows the results obtained with a machinery steel test bar; line 2 those obtained from a test bar of cold-rolled steel; line 3 is that traced from a brass test bar, and line 4 is the verdict acquired by pulling apart a cast-iron test bar. As will be seen, cast iron is brittle, has almost no elasticity and hence breaks at the elastic limit; brass has very little elasticity and breaks slightly above the elastic limit; cold-rolled steel shows some 8,000 pounds difference between the elastic limit and the ultimate tensile strength and machinery steel shows 26,500 pounds difference.

Many have argued that after the elastic limit of a metal has been passed its usefulness is destroyed. They base their argument on the statement that a given material might stretch for a long distance before breaking. They cite putty and other plastic materials as examples of this. Such arguments come, however, from a consideration of only a part of the problem strength of materials or from those who only know half of the truth.

As an example of this, steel wires, rods and cables that perform a work such as those do in the Brooklyn bridge might be loaded to 46,500 pounds per square inch and take a permanent set or reach their elastic limit if made from the machinery steel shown in the chart, Fig. 1. Their usefulness would not then be destroyed, as it would take 26,500 pounds per square inch more, or a total of 73,000 pounds, before a break would occur.

The frame of an automobile might be compared to the materials in a bridge, as it performs a similar work. The elastic limit of this may be considerably exceeded without causing it to break, and the breakage of the frame is the real important factor. Many an automobile has had its frame twisted and bent out of shape. This frame has been straightened and the car made to do its daily work thereafter. In these twists and bends the elastic limit has been exceeded but the ultimate strength has not been reached, hence the cars are as good for practical use as they were before. Even gear teeth, after they have been worn considerably, might be strained until the elastic limit was exceeded and thus be permanently bent. After that they might do a lot of work owing to their not having been strained until the ultimate tensile strength had been reached and the teeth thus broken.

A few cases of this nature, however, do not prove that the elastic limit of metals is not of vital importance. Most parts of a car should retain their original size and shape, if the car is to work properly and have a long life. If the elastic limit of many of the working parts is exceeded, their size is altered and they will not fit properly. This would cause them to interfere with other parts and hence clog them or seriously hinder their movements. In such places the elastic limit of the metals cannot be exceeded, and these are usually the parts that require the very strongest of materials. It is, therefore, the aim of many automobile designers to obtain materials in which the elastic limit can be raised up close to the ultimate strength and thus enhance their usefulness.

The elastic limit, as well as the tensile strength, can be greatly increased by a proper manner of heat-treatment, *i. e.*, hardening

and tempering. Many of the special alloy steels have been adopted for various important car parts, as with these the tensile strength can be raised to a high figure and the elastic limit brought up closer to it than can be done with the ordinary carbon steels. Nickel, nickel-chrome, vanadium and titanium steels can all be worked and heat-treated so as to bring the elastic limit up close to the tensile strength. This is well illustrated by the table herewith. Raising the elastic limit close to the tensile strength also greatly enhances the resistance of steel to tortional and impact strains, and to rotary and alternating vibrational stresses. Many parts of an automobile are subject to extreme strains and stresses of these natures.

All steels are much lower in tensile strength and elastic limit when in an annealed or normal condition than when correctly heat-treated. As they are shipped from the steel mill in this annealed condition they must be properly heat-treated in the automobile factory before they are put on the car. The difference of strength between annealed and heat-treated steels of various kinds is also well shown in the table. All of these cases show the importance of knowing the elastic limit as well as the tensile strength of the various metals used in a motor car.

Careful car builders pull apart sample test bars from each lot and kind of metal ordered and do not leave this to chance. The elastic limit is then always given with the tensile strength. It is, therefore, not difficult for the buyer, user or seller to obtain the information that is necessary for a thorough knowledge of the car's mechanism.

TABLE SHOWING THE EFFECT OF HEAT TREATMENT ON THE TENSILE STRENGTH AND ELASTIC LIMIT.

Kind of Steel.	ANNEALED STEEL.		HARDENED STEEL.	
	Pounds per Square Inch of			
	Tensile Strength.	Elastic Limit.	Tensile Strength.	Elastic Limit.
Very low carbon	61,500	35,200	73,100	39,600
Low carbon	66,500	41,200	99,400	54,000
Medium carbon	97,800	52,600	132,100	81,400
High carbon	116,400	66,500	153,400	102,100
Very high carbon	130,700	75,800	180,100	105,500
Nickel	88,000	60,000	225,000	224,500
Nickel	87,640	64,400	125,000	103,000
			127,800	110,100
		Drawn at Various Temperatures	130,500	124,000
			138,000	127,500
			147,000	140,750
			212,000	200,000
			232,750	224,000
Chrome nickel (soft)	114,000	93,000	206,000	185,000
Chrome nickel (hard)	135,000	107,000	285,000	270,000

Removing Odor from Rubber Articles

Rubber mats in the interior of closed automobiles are frequently objectionable by their odor. This can be removed, however, by subjecting them to the same process which is employed in the case of small articles of vulcanized rubber, such as tobacco-pouches and dress-shields, which are carried on the person. The articles to be deodorized are placed in a metal box between layers of finely pulverized carbonized bone, and the box is then left for four to eight hours, according to the size of the articles, in a place, such as a drying room, where a temperature of 60 to 70 degrees Centigrade can be maintained. If the bonemeal is to be used again for the same purpose, it must first be brought to red heat in a closed metallic vessel, in the cover of which there must be a vent, and it must be left to cool therein. The deodorized rubber articles must not be placed together with other rubber articles which have not been so treated, as they will acquire their old odor again, in that case, with surprising rapidity. Unburned magnesia powder can also be used for removing the odor. Merely sprinkling it over the article will have some effect.—From *Gummi Zeitung*, August.

Calendar of Coming Events

Shows

Dec. 30-Jan. 6.....Buffalo, N. Y., Annual Show, Seventy-fourth Regiment Armory, Buffalo Automobile Trade Association.
Jan. 2-11.....New York City, Hotel Astor, Importers' Salon.
Jan. 6-13.....New York City, Madison Square Garden, Twelfth Annual Show, Pleasure Car Division, Automobile Board of Trade.
Jan. 6-20.....New York City, Madison Square Garden, Annual Show, Motor and Accessory Manufacturers.
Jan. 10-17.....New York City, Grand Central Palace, Twelfth Annual Show, National Association of Automobile Manufacturers; also Motor and Accessory Manufacturers.
Jan. 13-27.....Philadelphia, Annual Show, First and Third Regiment Armories, Philadelphia Automobile Trade Association.
Jan. 15-20.....New York City, Madison Square Garden, Twelfth Annual Show, Commercial Division, Automobile Board of Trade.
Jan. 13-19.....Milwaukee, Wis., Auditorium, Fourth Annual Show, Milwaukee Automobile Dealers' Association
Jan. 22-27.....Detroit, Mich., Wayne Gardens, Eleventh Annual Show, Detroit Automobile Dealers' Association.
Jan. 22-27.....Providence, R. I., Providence State Armory, Rhode Island Licensed Automobile Dealers' Association, Automobile and Accessories Show.
Jan. 27-Feb. 10....Chicago Coliseum, Eleventh Annual Automobile Show under the auspices of the National Association of Automobile Manufacturers. Pleasure cars, first week. Commercial vehicles, second week.
Jan. 27-Feb. 10....Pittsburgh, Pa., Sixth Annual Show, Automobile Dealers' Association of Pittsburgh, Inc. Pleasure cars, first week. Commercial vehicles, second week.
Jan. 29-Feb. 3.....Scranton, Pa., 13th Regiment Armory, Second Annual Show.
Feb. 1-7.....Washington, D. C., Annual Show, Convention Hall.
Feb. 3-10.....Montreal, Canada, National Show, Drill Hall, Automobile Club of Canada.
Feb. 5-17.....St. Louis, Mo., Coliseum, Annual Show, Pleasure cars, first week. Commercial vehicles, second week.
Feb. 12-17.....Ottawa, Ont., Howick Hall, Annual Show, Ottawa Valley Motor Car Association.
Feb. 12-17.....Kansas City, Mo., Annual Show, Combined Association of Motor Car Dealers.
Feb. 14-17.....Grand Rapids, Mich., Third Annual Show.
Feb. 17-24..... Pittsburgh, Pa., Second Annual Show, Exposition Bldg., Pittsburgh Auto Show Association, Inc.
Feb. 17-24.....Newark, N. J., Fifth Annual Automobile Show, New Jersey Automobile Exhibition Company, First Regiment Armory.
Feb. 17-24.....Minneapolis, Minn., National Guard Armory and Coliseum, Annual Automobile Show, Minneapolis Automobile Show Association.
Feb. 19-24.....Omaha, Neb., Seventh Annual Show, Auditorium, Omaha Automobile Show Association.
Feb. 19-24.....Hartford, Conn., Annual Show, Automobile Club of Hartford, State Armory.
Feb. 20-24.....Binghamton, N. Y., State Armory, Third Annual Show, Automobile Dealers' Association.
Feb. 20-28.....Baltimore, Md., Annual Show, Baltimore Automobile Dealers' Association.
Feb. 21-28.....Toronto, Ont., Annual Show, Toronto Automobile Trade Association.
Week Feb. 22.....Cincinnati, O., Annual Show, Cincinnati Automobile Dealers' Association.
Feb. 24-March 2...Brooklyn, N. Y., Twenty-third Regiment Armory, Annual Show, Brooklyn Motor Vehicle Dealers' Association.
Feb. 26-Mar. 2.....Elmira, N. Y., Second Annual Show, Elmira Automobile Club.
Feb. 26-Mar. 2.....Paterson, N. J., Annual Show, Fifth Regt. Armory, Paterson Automobile Trade Association.
March 2-9.....Boston, Mass., Tenth Annual Show, Boston Automobile Dealers' Association, Inc.
March 4-9.....Denver, Col., Auditorium, Annual Show.

Meetings, Etc.

Dec. 20.....New York City, Waldorf-Astoria, Annual Banquet of the Automobile Club of America.

THE AUTOMOBILE

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Growth of Automobiles

FEW statements show better the growth of automobile traffic in the country than those made by Colonel William D. Sohier, high commissioner of the State of Massachusetts, at the recent good roads convention at Richmond. In order to get an accurate estimate of the kinds of traffic on the roads of the state 240 stations for counting traffic were selected along these highways. For 14 hours each day and for 7 days in August and 7 days in October this count was carried on. By this actual method of counting it was discovered that on some of the leading state roads 90 per cent. of the traffic was of the motor car variety and that as many as 1,190 cars passed a given point in a single day. Roughly, the fact showed that on some of the roads adjacent to Boston, where mixed traffic was expected, over 60 per cent. of the vehicles were motor-driven. When the average for all of the stations throughout the entire state was taken it was discovered that on the 7 days in August 42 per cent. was motor traffic and in October 35 per cent. motor and 65 per cent. horse traffic. Before these figures were announced it was commonly stated that horse traffic was nearly five times as great as motor traffic, a claim doubtless due to the fact that horse traffic moves slowly and that a horse vehicle may be seen many times on the highway before it has vanished from sight, whereas the motor vehicle is generally seen but once and that for a very short time before it vanishes from sight. This count has demonstrated to the people of Massachusetts that the motor vehicle will in perhaps another year have dislodged the horse vehicle from the position of premiership it has occupied.

The big lesson in the above figures is the application of this truth to the good roads problem. Up to the present the farmer and many legislators have urged that owing to the motor vehicle constituting a small percentage of the total traffic it should not receive as much consideration in the road building business as the horse-drawn vehicle. This count establishes beyond the shadow of a doubt that when road building is under consideration in that state those kinds of roads best suited to the motor car should be first considered. The days were when in building a road the question was to build a road for horse traffic; to-day this is changed and the problem is to build a road suited for motor vehicle traffic. The last few years have proven that roads suited for horse traffic are not suited for motor traffic. The macadam which is successful for horse traffic is an utter failure for motor traffic and states that are building macadam roads to-day and expecting them to endure will be disappointed in less than a year. The road for the motor vehicle requires a good binder, a substance that will hold the road material together, a substance that prevents disintegration due to too much moisture and a substance that will bind the road surface together in dry weather and so prevent dust. Many state road commissioners have known for years the kind of road best suited for motor traffic, but owing to the imagined preponderance of horse traffic they have not dared to build the motor road. Massachusetts deserves credit in setting an example to other states. It is questionable if in any other state the percentage of motor vehicle traffic is so heavy, but the truth is always strong and it would be well for others to get the exact status of the road traffic.

One of the factors much in favor of motor traffic is the low percentage of accidents with automobiles as compared with horse-drawn vehicles. Roughly speaking the accidents with trolley cars per mile traveled is eight times that of motor vehicles. From newspaper accounts it would seem that with the automobile the number was many times greater per traveled mile than with the trolley. The trolley with its own right of way and its confined road of travel should not meet with so many accidents as the newly arrived motor car. These facts speak well for the control of automobiles as well as for the caliber of the people operating them.

So great has the motor industry become in the older states that the old-time antipathy is not encountered and in the new states of the West so many of the farmers are buying cars and this new method of transportation is so popular that the antipathy that is sometimes shown in the East will never exist there. It is fortunate that the good roads movement is rising with the waning of the antipathy, because it brings farmers and car owners together in the work that is so much needed. It is questionable if there is any other force of greater influence in winning interest in good roads than the fact that the car has been taken up in the small towns and cities where the farmer gets closer to the machine owner than he does in the big cities. Once the farmer owns a car, be it ever so small, or rides in one, he becomes a convert to the good roads cause and as soon as one farmer is won over the others soon follow. The modern automobile is a great educator and the road improvement made during the last year in such states as Iowa and Georgia, to which might be added Nebraska and Colorado, is largely due to the education worked and inspiration stimulated by the car. To-day delegates are going to the good roads conventions in their motor cars instead of in the trains. Some delegates tried to reach the Richmond convention of last week in their cars but failed because of the deplorable condition of the roads. Their failure has but created a stronger conviction for the necessity of good roads. The automobile has been largely responsible for this situation.

News of Shows, National and Local

WITH seventy manufacturers of commercial vehicles and 138 parts and accessory makers signed up to show at Chicago, truck week prospects for the annual automobile show present brilliant possibilities. It has been estimated that the use of commercial vehicles in Chicago territory has increased 35 per cent. during the past year, and the business element of the territory is much more intensely interested in automobile trucks than it was formerly. Consequently, a larger patronage of the coming show is looked for than ever before.

The poster which will be used to advertise the Madison Square Garden show of the Automobile Board of Trade has made its appearance. The subject is an Oriental girl bedecked with Eastern jewels and wings. She stands with arms outstretched, holding a passenger automobile in one hand and a business wagon in the other.

Only progress was reported on the plans of the new show building which will be erected north of the present Grand Central Palace. After they are completed it will be necessary to lay them before the New York Central for approval and pending such approval the authorities decline to give out anything official.

Plans for Washington Exhibition

WASHINGTON, D. C., Nov. 27—Plans are under way for the annual motor car show under the auspices of the dealers of this city. A meeting was held this week, which was attended by thirty-three dealers, representing eighty-five different makes of cars, and the following show committee was elected: W. C. Long, chairman; John R. Thomas, secretary; J. M. Stoddard, treasurer; Claude Miller, T. S. Johnston, Taylor Pollock, E. C. Bull, and S. A. Luttrell. February 1-7 were the tentative dates agreed upon.

There is also some question whether Convention Hall, which is the only available place in which to hold a show, can be obtained on that date. It was decided to confine the show to pleasure cars, eliminating accessories and motor trucks. This decision caused a slight row among those who were thus barred from the show, but as the pleasure car dealers were in large majority and as there was every assurance that every inch of space would be taken by them, the decision was allowed to stand. Drawing for space will take place within the next two or three weeks.

Detroit Dealers' Show January 22-27

DETROIT, MICH., Nov. 27—Practically every Detroit manufacturer of motor cars and no less than 35 dealers, handling all the best-known cars manufactured in this country, will be represented at the 1912 show of the Detroit Automobile Dealers' Association, to be held in the Wayne pavilion, January 22 to 27.

Those who have already secured space are: The Regal Motor Car Co., the Elmore Automobile Co., the Chalmers Motor Co., Cartercar Co., Cadillac Motor Car Co., Olds Motor works, Standard Automobile Co., representing the Packard Motor Car Co.; Winton Motor Car Co., Brush-Detroit Motor Co., Neumann-Lane Co., agents for the Pierce, Stoddard-Dayton and Rauch-Lang cars; the Buick Motor Co., Lozier Motor Co., Cunningham Auto Co., agent for the E-M-F and Flanders cars; the Ford Motor Co., Abbott-Detroit Motor Co., Lion Motor Sales Co., Seidler Motor Sales Co., agents for the Jackson car; Warren Motor Car Co., Gant Bros. Auto Co., agent for the Everitt and Amplex cars; United Motors Detroit Co., representing the Maxwell cars and the Sampson truck; Thompson Auto Co., agent for the King car and the Van Dyke and Mack trucks; the General Motors Co., showing the Reliance and Rapid, Buick and other commercial vehicles; J. P. Schneider Co., representing the Stevens-Duryea car; Detroit Hupmobile Co. and the Gillespie Auto Sales Co.

The following independents have applied for space: Anderson Electric Car Co., maker of the Detroit Electric; the Motor Wagon Co., Oakland Motor Sales Co., the Paige-Detroit Motor Car Co., the Hupp Corporation, representing the R. C. H. car; Foster Motor Sales Co., the Church-Sibley Co., the manufacturers of the Paterson Car and others.

S. A. E. Party Ready to Sail Home

Advices cabled from Paris by Coker F. Clarkson, secretary and general manager of the Society of Automobile Engineers, make the announcement that the delegation from the society which has been spending a month inspecting British and Continental factories and engaging in scientific conferences will sail for New York on the steamer *Olympic* November 29.

Mr. Clarkson says that the visit has been a great success in every way, and that the foreign manufacturers have done everything possible to assist the visitors. Not all the party will return on the *Olympic*, as quite a number will remain abroad for several weeks longer to make more detailed inspections and to go into fields not touched by the regular itinerary. Plans for the annual meeting of the society are being matured and it is expected that the Madison Square Garden program will include forty or more formal papers in which the commercial vehicle will come in for considerable consideration.

Solid Tire Patent in Federal Court

Orders issued by the United States Circuit Court in the suits of the Consolidated Rubber Tire Co. against the Goodrich, Republic Rubber and Morgan & Wright companies, based upon the alleged infringement of the Grant patent on solid tires, allow each of the three defendants 60 days in which to plead to the complaints.

The suits were instituted about two years ago and have lain practically dormant pending a decision of the patent by the Supreme Court. This was handed down last spring, and now the present suits will be determined.

The complaining company alleged that the Grant patent was valid and belonged to it and charged that the defendants infringed it. Preliminary injunctions were issued and the cases will be tried upon their merits, probably at the spring term of court. The plaintiff company seeks permanent injunctions, an accounting with each defendant and damages.

Rubber Sellers Sue Michelin

Echoes of the explosion of the late rubber bubble were heard in New York last week when Poel & Arnold entered seven suits against the Michelin Tire Co. based upon alleged contracts of sale made during the period of market inflation in the early part of 1910. It is charged by the complaining company that the defendant refused to accept the rubber sold and that in consequence of the falling market since that period the sellers lost a considerable amount.

The matters will hardly be ready for trial until next spring.

LONDON, Nov 20—How London secures the best cab service in the world at a lower price than any other city was revealed in a visit which the members of the Society of Automobile Engineers made to the depot of W. & G. Du Cros, Ltd. London possesses between 7,000 and 8,000 motor cabs plying for hire at the uniform rate of 16 cents for the first mile and 4 cents for each additional quarter mile.

Messrs. W. & G. Du Cros operate 1,200 cabs and always have 1,050 in use, the remainder being in the depot for overhauls and repairs. Napier has supplied 800 of the chassis and Panhard 400, all being four-cylinder models of practically 80 by 120-millimeter bore and stroke. The organization is such that the cabs are in service every day. There is one driver per cab, the system of double shifts having been found to be unsatisfactory, and each driver must keep his cab out 12 hours per day.

Payment is made on the basis of 25 per cent. of the net takings, the driver buying his gasoline from the company at cost price, 18 to 20 cents per gallon, and being provided free with everything else necessary for running. It is the company's task to so organize their depots that no cab shall be kept off the street except for the periodical overhauls.

It was explained to the visitors how, after coming in at night, every cab was got ready for the road the next morning, no matter what its condition, after a hard day's work punctuated with accidents. Only a complete wreckage of the cab would necessitate its stoppage in the depot for more than one night. In addition to washing, inflating tires, filling tanks, oiling, touching up paint work, etc., the organization is so good that such serious damage as the breakage of the crank hangers, the rupture of the differential or the changing of the gearbox could be repaired between midnight and 10 o'clock the next morning. The company buys its own tires, of 815 by 105 millimeter section, and by a systemized method of nightly examination and repair whenever necessary can get a much higher average in the hands of rough drivers than is possible by many private car owners. Two steel-studded tires are used, one on the rear, and the other on the opposite front wheel.

Each cab travels from 60 to 80 miles a day, two-thirds of this distance being on paying trips. The minimum earnings are $8 per day, of which amount the driver will keep $2. Depreciation is based on a period of seven years, and, according to the engineer in charge, the cabs which have already been in service three and one-half years are in every respect equal to new. The cabs cost from $1,500 to $1,700 complete. The recording instrument is not included in the amount, this being rented from the taximeter manufacturing companies.

What S.A.E. Tourists

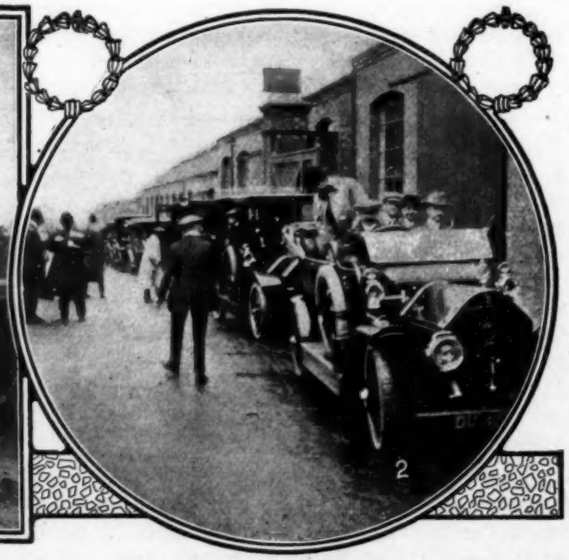
One hundred and forty persons, about forty of whom were members of the Society of Automobile Engineers, united at the Trocadero restaurant, Piccadilly, London, for the banquet given by the Institution of Automobile Engineers in honor of the visit of the Americans. The chair was occupied by L. A. Legros, M.Inst.C.E., and president of the Institution of Automobile Engineers. After the toasts of the King and the President of the United States had been cordially honored, F. W. Lanchester proposed the Society of Automobile Engineers, and H. F. Donaldson replied. The Institution of Automobile Engineers was proposed by Howard E. Coffin, and replied to by Dr. H. S. Hele-Shaw. "Our Guests" was proposed by T. E. Browne, and replied to by Edward B. Ellington and Sir George Gibb.

Typical London November weather prevailed when, at 11 o'clock on Sunday morning, about 20 Ford cars called at the headquarters to carry the entire party to Brooklands motordrome, about 20 miles out of town. The showers, however, were unable to damp the spirits of the party, and even the arresting of C. H. Foster, president and general manager of the Gabriel Horn Company, and a couple of the Ford drivers for exceeding the speed limit only served to add interest to the run.

Lunch was taken at The Hut, Wisley, a typical English hostelry on the road from London to Portsmouth, and the run was continued to the track, where a couple of hours were spent in racing over the cement surfaced speedway, climbing the 25 per cent. test hill, and examining the unique timing apparatus.

After six days in London practically the entire party moved northward to Coventry, a town which may very accurately be described as the Detroit of Great Britain, for it is here that about three-quarters of the English factories are situated. A number of automobiles being in waiting, the visitors were taken direct to the Humber factory, and after presentation to the general manager, H. G. Burford, were shown through the works. Originally devoted to bicycle construction, the Humber factory now produces automobiles, motorcycles and bicycles, the number of cars produced being about 2,000 per year, and the number of motorbicycles 4,000 to 5,000 a year. A staff of 3,000 men is employed.

The stop for lunch at the Hut on the way to Brooklands.



Leaving the Humber factory, Coventry

Saw on British Trip

The high standard of factory management, and the comparative youthfulness of the heads of important departments came as a surprise to some of the members of the party, who had expected to find other conditions. The prodigality of labor, compared with American methods, was noted, but was readily understood in view of the lower rates of wages paid. Among the features which attracted attention were the water brake for engine testing, and the use of a chain for driving the camshaft of the Humber motors. It was explained that the practice was to use a Coventry chain which had been run in on a jig for a fortnight without a stop, this being equal to road service of 10,000 miles. There would be a stretch of one-sixteenth of an inch on the length of the chain, but after this treatment no further stretch would take place, and no provision for taking up slack was provided on the motor. The Humber company entertained the engineers at lunch at the King's Head Hotel, under the chairmanship of D. F. Basden, president of the company, supported by Ballin Hinde, vice-president, and H. G. Burford, general manager. On the afternoon of the same day a visit was made to the works of Alfred Herbert, Ltd., one of the largest machine-tool makers in England.

The greater portion of the second day's visit to Coventry was spent at the Daimler Company's factory, the first one in Britain to be devoted exclusively to automobile construction, and at present the largest in England, the output being about 3,200 cars a year, and the entire staff numbering nearly 5,000 men. As is generally known, the Daimler Company of Coventry produces Knight motors to the entire exclusion of the poppet-valve type, the motors being built for their own cars and for several other firms holding the Knight license but not yet in a position to produce sleeve-valve motors. These large Diesel motors used for generating current attracted particular attention, as did also a gasoline-electric bus with two Knight motors, one on each side of the frame, with separate drive to each rear wheel.

For the second time the visitors were entertained at luncheon, the hosts on this occasion being the Daimler Company, represented by Percy Martin, vice-president, in the chair, supported by E. M. C. Instone, the business manager, and by Charles Y. Knight. In replying to the toast of "The Guests," proposed by Mr. Knight, H. F. Donaldson echoed the sentiments of the whole party when he declared that they had considered London the apex of cordiality, for they had been received as cousins; but at Coventry they had been welcomed as brothers. A busy afternoon was occupied in visiting the wire wheel factory of the Rudge-Whitworth Company, where sets of wire and wood wheels were tested to destruction; examining the plant of the Coventry Chain Company, the makers of most of the chains now used for driving camshafts, and a run through Warwick, Kenilworth and Stratford-on-Avon in Daimler cars supplied by Mr. Knight.

Birmingham tried to outdo Coventry in the matter of hospitality. When the members of the Society of Automobile Engineers arrived at the works of the Wolseley Tool & Motor Company they found the Stars and Stripes flying side by side with the Union Jack and an open house and a glad welcome within

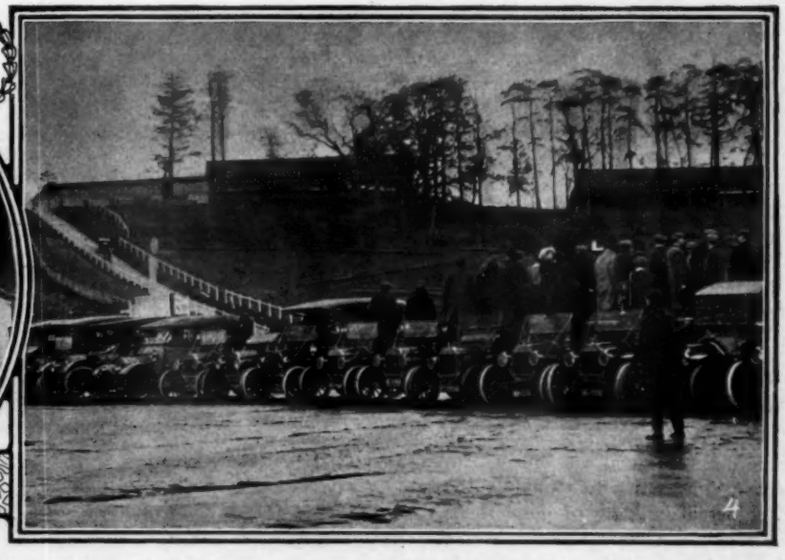
Very close attention was paid by the visitors to the cutting of worm gears for final drive, the Wolseley company using the worm for its 12 and 16-horsepower models, and bevel gears for all the larger types. It was declared that the efficiency was equal on the two types, and that they had been able to make the bevel just as silent in action as the worm; this was due in a large measure to the method of hardening each tooth of the crown-bevel wheel separately under an oxy-acetylene flame. Each wheel is mounted in a bath so that it can be revolved, and the tooth just on the surface of the water is operated upon with the flame. It is declared that by this method all possibility of distortion of the bevel wheel is removed. The new case-hardening rooms with the pyrometer going direct to the laboratory, thus removing all responsibility for the temperature from the workmen, were examined with interest.

The bench tests of the motors are carried out in the usual way and as soon as a motor is passed as satisfactory it is torn down, examined and washed piece by piece under a powerful jet of kerosene. Each chassis is taken on the road by three different testers, all of whom must fill in a very detailed report covering practically every portion of the mechanism, and stating the road and weather conditions which obtained during the tests.

When the car has been declared satisfactory it is again pulled down, examined for traces of wear, and finally assembled. Although building in series, the factory pays close attention to individual requirements in the matter of the body and fittings.

After the visit to the factory the officials of the Wolseley Company entertained the visitors at luncheon at the Grand Hotel, Birmingham, the president on the occasion being Mr. MacCormack, general manager of the company, supported by Max R. Lawrence, works manager, and Mr. Royce.

Legros of I. A. E. explains things to Coffin



Group of motorists watching car climb test hill at Brooklands

First American Road Congress Meets

RICHMOND, Nov. 23—The 4-day convention of the first American road congress of the recently organized American Association for Highway Improvement, ended in this city this afternoon with the election of officers for the coming year. The sessions proved to be of interest from start to finish. Over 500 delegates from all of the states and territories of the Union attended and the discussions following the different addresses proved how much attention is being devoted at present to the good roads movement. The two opening days of the convention were given over to the road builders, many of the leading civil engineers of the country being present. In fact, more of these attended than at any previous road congress. A novel feature of the convention, and one which appealed especially to motor car owners, was the third day, which was known as road users' day. The program for it was handled by the Touring Club of America, and it had gathered together several of the leading legal lights in the country who have to do with automobile legislation, as well as not a few of the leading car manufacturers. Among the legal representatives were Edward Lazansky, Secretary of State, New York; Matthew S. Rogers, Secretary of State, Connecticut; and Highway Commissioner Colonel William D. Sohier, of Massachusetts. In the automobile manufacturing field were Colonel Clifton, president of the Automobile Board of Trade, and Hugh Chalmers. Major Richard Sylvester, president of the International Police Association, spoke on the regulation of traffic in cities. Other speakers were Sidney S. Gorham, Chicago, and Preston Belvin, president of the Virginia Automobile Association.

Special interest attached to the addresses of Colonel Sohier and also of Secretary Lazansky, both of whom presented statistics to show the present status of the motor car in their respective states and sections. In the year 1901 there were 954 cars registered in the Empire state whereas this year there were upwards of 85,000 cars registered. Nearly 34,000 chauffeurs have been registered.

Basing his calculations on these figures the speaker showed that to-day there is approximately $85,000,000 invested in cars in the state and that a little over $42,000,000 is expended annually in maintaining these.

In speaking on the number of cars owned throughout the country, Secretary Lazansky based his figures on the data obtained from the government figures which showed up to the present, a registration in thirty-five states of approximately 517,000 cars, of 174,000 registered chauffeurs and total receipts from registrations of $3,746,938.

Colonel Sohier spent most of his time on showing the number of cars in use in Massachusetts as compared with horse vehicles and also proving the point that motor vehicles cause many fewer accidents per mile traveled than trolley cars. He brought out the amazing fact that horses are decreasing in city use in the big cities but gaining in use in the country, but when the totals are looked into it is found that the horse is on the decline so far as numbers in use in Massachusetts are concerned.

Colonel Clifton was reminiscent of the early days of motoring to show the conditions of roads when the New York-Buffalo and New York-Pittsburgh tours took place. He used this as a basis for showing that since the inception of the automobile industry the car maker has always taken the attitude of co-operation with the different good roads organizations. He showed that contests have done much to stimulate the good roads cause as well as the actual building of good roads.

Hugh Chalmers showed how that the automobile is not the only industry that is benefited by good roads but cited how it costs 23 cents a mile to handle a ton of goods on the American roads as compared with less than 10 cents a mile on European roads. On some of the English roads entering London where motor trucks are used, the cost is less than 4 cents a mile. If the freight bill of this country could be cut in half it would mean a saving to the people of $250,000,000 a year. In speaking of the cost of building modern roads in different sections of the country, he brought out the fact that in North and South Carolina macadam roads can be built for $1,800 per mile; and that in nine states in the South the average cost of macadam roads approximate $4,000 per mile. In southern Ohio bituminous macadam roads cost $7,000 per mile; in Massachusetts the average macadam road costs $8,000 per mile and in New York State the new roads are costing $9,000 per mile. Ohio has some brick roads which cost from $10,000 to $14,000 per mile.

Following is an extract of Colonel Sohier's address on motoring conditions in the State of Massachusetts:

It may be well to consider what the character of the travel that is using our highways at particular points is, and how that travel is likely to develop in the future. In 1909 the Massachusetts highway commission made a traffic census of the vehicles using state highways. The passing vehicles were actually counted at 240 stations upon our state highways scattered throughout the state for 14 hours a day, 7 days in August and 7 days in October. They were classified into heavy and light horse-drawn vehicles, and the motor vehicles were divided into touring cars and runabouts. At that time the motor truck had not appeared. I insert a table which gives a summary of this traffic census.

The actual count showed that on some of the roads the motor vehicles, even at that time, constituted 90 per cent. of the traffic, and in several instances over 1,100 cars a day passed a given point. A census was taken at certain places in the parkways near Boston, and this count showed over 60 per cent. automobile travel and over 3,000 automobiles a day. Even at that time, therefore, on many of our highways, especially on the main routes, it was found that the motor vehicle constituted more than one-half of the travel.

Average Daily Traffic—All Stations

	August Census	October Census
Horse-drawn:		
Light	19,622	16,456
Heavy	17,969	17,967
Total	37,591	34,423
Automobiles:		
Runabouts	5,922	3,995
Touring cars	21,387	14,514
Total	27,309	18,509
All kinds	64,900	52,952
Per cent. horse-drawn	58%	65%
Per cent. automobile	42%	35%
Average per station:*		
Horse-drawn:		
Light	83	69
Heavy	76	75
	159	144
Automobiles	115	77
All kinds	274	221

*In August 237 stations; in October 240 stations.

Accidents on Our Streets and Highways

Automobile accidents throughout the country were receiving an undue share of notoriety. They were given scare headlines in the papers, partly because this is a new means of locomotion and partly because of the prominence of the people occupying the automobiles. I think this matter will be of some interest to you. Please remember that of all the automobile accidents which we were able to hear of and record, 960 of the total of 1,182 accidents in 1910 occurred in city streets. In other words, four accidents occurred in city streets to every one in the country.

During the year ending November 30, 1910, according to the report of the police commissioner, the following number of people were killed and injured in the streets, parks and squares of Boston:

Total number of people killed	94
Total number of people injured	2,025
Due to traffic:	
Deaths	50
Injuries	1,022

In other words, only one-half of the deaths and only one-half of the injuries were due to traffic. Very few of these injuries were due to fire engines, bicycles or trains, so these figures are omitted.

Deaths and Injuries by Traffic

Total number of deaths	50
Due to horse-drawn vehicles	15, or 30%
Due to trolley cars	22, or 44%
Due to automobiles	13, or 26%
Total number of injuries	1,022
Due to trolley cars	383, or 37½%
Due to horse-drawn vehicles	359, or 35 %
Due to automobiles	280, or 27½%

In this same period of time various other accidents were due to other causes, by far the largest of which was falls resulting in twenty-three deaths and 777 injuries.

In other words, there were nearly twice as many deaths and nearly twice as many injuries in the streets of Boston which were due to people falling in the street and being injured than were due to motor vehicles. It is a little hard to make comparisons, because the *numbers* of electric cars, horse-drawn vehicles and automobiles is not really a fair criterion. The mileage should also be taken into account.

Increase in Motor Vehicles

To make a comparison today, we should consider the growth of the number of automobiles using our streets:

In 1903, 3,241 automobiles were registered in Masssachusetts.
In 1909, 23,902 automobiles were registered in Masssachusetts.
In 1910, 31,347 automobiles were registered in Masssachusetts.
In 1911, 38,677 automobiles were registered in Massachusetts.

At least 5,000 dealers' cars are registered as well. Since our traffic statistics were taken the number of automobiles registered in the State has increased over 60%.

Decrease in Horses

In Massachusetts, in 1909, about 169,000 horses were assessed, and in 1910 about 165,000. In this one year the number of horses assessed had decreased 4,000, and the number of automobiles registered had increased 7,400. Undoubtedly, there is more of a change this year.

I merely put in these figures as preliminary to further consideration of to what extent the automobile is responsible for the accidents which occur on our highways. It is evident today that they constitute fully 50% of all the vehicles that are passing over our highways.

Trolley Cars and Motor Vehicles

It is interesting to compare upon this basis of mileage the accidents occasioned by trolley cars and the accidents occasioned by automobiles. The trolley car mileage and accidents are both official figures taken from the railroad commissioners' report:

TROLLEY CARS:—Miles Traveled		87,712,572
Fatal Accidents:		
Passengers and employees	28	
Outsiders	78	
Total	106	
Injuries:		
Passengers and employees	5,273	
Outsiders	1,917	
Total	7,190	
MOTOR VEHICLES:—Miles Traveled		185,806,000
Fatal Accidents:		
In Motor Vehicles	25	
Outsiders	52	
Total	77	
Injuries:		
In Motor Vehicles	378	
Outsiders	585	
Total	963	

Assuming that the above mileage for motor vehicles is correct, we should have the following results:

Number of Miles Traveled by Trolley Cars and Motor Vehicles to Each Ensuing Accident

	Trolleys	Motor Vehicles
Miles per accident to anyone, including fatal cases	12,053	178,660
Miles traveled per fatal accident	827,477	2,413,065
Miles traveled per injury	12,199	192,945
Accidents to Persons Who Are not Employees or Occupants of Cars:		
Miles traveled per accident	44,389	291,689
Miles traveled per fatal accident	1,124,520	3,573,192
Miles traveled per injury	45,755	317,617
Accidents to Employees and Occupants of Cars:		
Miles traveled per accident	16,546	461,057
Miles traveled per fatal accident	3,132,449	7,432,240
Miles traveled per injury	16,634	491,577

Automobile Legislation in Massachusetts

No person can operate an unregistered motor vehicle and no person can operate a motor vehicle without having received a license from the Massachusetts highway commission.

The commission *may revoke* a license, after due hearing, for any cause it may deem sufficient; and it *may suspend* a license, without a hearing, whenever it has reason to believe that the holder thereof is an improper or incompetent person to operate motor vehicles or is operating improperly or so as to endanger the public; and the license shall not be reissued unless the commission, upon examination or investigation, or after a hearing determines that the person should again be permitted to operate.

In 1908 the commission was authorized by law to investigate automobile accidents. Whenever a death results from any such accident, the commission *shall suspend* forthwith the license of the operator of the motor vehicle involved, and it *shall revoke* said license unless after an investigation or hearing, it determines that the accident occurred without serious fault upon the part of the operator.

The commission *shall revoke* the license of a person three times convicted of overspeeding in any one calendar year; and no new license may be issued to such a person until after the expiration of a period of 30 days from the date of the third conviction. Acts of 1909. The commission *shall revoke* the license of any person convicted of operating a motor vehicle recklessly, or while under the influence of intoxicating liquor, or so as to endanger the lives or the safety of the public; or upon a bet, wager, or race; or for the purpose of making a record; or of going away without stopping and making himself known after causing injury to person or property; or of using a motor vehicle without authority; and no new license shall be issued to any such person before the expiration of a period of 60 days from the date of conviction nor thereafter except in the discretion of the commission.

The commission, by law, has the right to appoint investigators and examiners. It has appointed seven such investigators and examiners and they are among the most competent men of their class to be found anywhere. These examiners examine every chauffeur before he receives a license. He is required to pass a written examination and also to pass a severe operating test on the road.

Examinations held in 1910	5,433
Number of persons examined	4,138
Number of persons receiving licenses	3,701
Number of persons failed on first examination	1,268
Number of persons refused a license after several examinations	437

In other words, over 10% of all the persons examined failed to receive a license, and nearly 25% of all the persons failed to pass upon the first examination.

Investigation of Accidents

During the year 1910 its investigators made investigation and reported 429 accidents. In that year 283 licenses or registration certificates were revoked or suspended. The causes of these revocations and suspensions were shown in the following table:

Reckless operation	50
Operating while under the influence of intoxicating liquor	22
Accidents resulting in death	57
Improper operation	88
Refusing or neglecting to stop after accident	9
Three overspeeding convictions	8
Operating automobiles without owner's permission	23
Other offenses	26
Total	283

Motor Vehicle Accidents

The following table of accidents which occurred in Massachusetts in 1909 and 1910 may be of interest:

	1909	1910
Total number killed	54	77
Total number injured	989	963
Total number of accidents	1,130	1,182
Total number of accidents in daytime	826	867
Total number of accidents after dark	304	315
Total number of accidents on country roads	314	222
Total number of accidents on city or town streets	816	960

In 10 months of the year 1911, there were 1,229 such accidents. In this connection, it must be remembered that in 1909 something under 24,000 automobiles were registered in Massachusetts and that in 1911 (allowing only five cars for each dealer) there were something over 42,000 automobiles registered. In other words, the number of automobiles using our highways has increased in that two years something over 60%. The number of accidents has only increased about 10%.

Causes of Accidents

It may be interesting to see what, in the opinion of the commission, after careful investigation and report upon all the evidence, was the cause of some of the more serious of these accidents. I have made an abstract of a few of the more serious accidents for 10 months of this year—from December 1, 1910, to October 1, 1911, as shown by the following table:

Total number of accidents investigated and acted upon	278
Operator without fault	110
Other party to accident more to blame than operator, but operator not blameless	20
Operator more to blame than other party to accident, but latter at fault also	24
Operator entirely to blame	114
Both operators equally to blame	10

You will note that after a full investigation, involving a statement taken from all of the witnesses and a careful report from our investigator, and consideration by the commission, in nearly 40% of all of these accidents the operator was not to blame.

As a result of the discussion, the committee on resolutions selected by the Touring Club of America recommended and secured the adoption of the Road Congress of the following suggestions for traffic regulation:

WHEREAS, the safety of the public is of primary importance, and the driving of vehicles at night is attended by dangers which should be reduced to a minimum;

Now, therefore, Be it further *Resolved*, That it is the sense of this Congress that from sunset to sunrise, all vehicles should carry at least one lighted lamp of sufficient candle power to be visible at a distance of 200 feet, so placed as to be seen from the front and left side, and a red light visible in the reverse direction, and

Be it further *Resolved*, That the use in cities and villages of non-dazzling headlights on all vehicles should be required by law, wherever the streets are adequately lighted, and

WHEREAS, the highways within the confines of the cities, towns and villages, as well as in the open country, are dedicated to the public use,

Now, therefore, be it *Resolved*, That all users of said highways should have due regard for the rights of other users, the pedestrian for the rights of horse-drawn vehicles, the drivers of horse-drawn vehicles for the rights of the drivers of motor vehicles, the drivers of motor vehicles for the rights of cyclists, the cyclists for the rights of equestrians, and one and all for the rights each of the others, and

Be it further *Resolved*, That the use of the muffler cut-out in thickly settled sections and in cities should be discontinued, and

Be it further *Resolved*, That the unnecessary use of warning signals should be avoided, and that an adequate warning signal should produce an abrupt sound, sufficiently loud to be heard under all conditions of traffic, nd that its use except as a warning of danger should be prohibited by law, and

Be it further *Resolved*, That in cities, towns and villages, slow-moving vehicles should be required to drive close to the curb in order that the faster moving vehicles may pass in the center of the thoroughfare, and

Be it further *Resolved*, That in view of the fact that the motor vehicle is used for interstate communication, frequently passing through two or more states during a single day, uniform speed regulations should be adopted by all states, and local authorities, such as cities, towns and villages, should be prohibited from fixing local speed regulations, and

Be it further *Resolved*, That in view of the rapid development of commercial motor trucks for inter-city use, the public authorities charged with the duty of building and maintaining bridges should be required periodically to inspect all bridges under their jurisdiction and post conspicuously thereon the wheel load they are capable of sustaining, and

Be it further *Resolved*, That in view of the unprecedented growth of interstate and inter-city motor traffic for commercial purposes, a systematic and adequate placarding of roads by sign-boards, giving directions as to towns and distances should be required by law, and such laws strictly enforced.

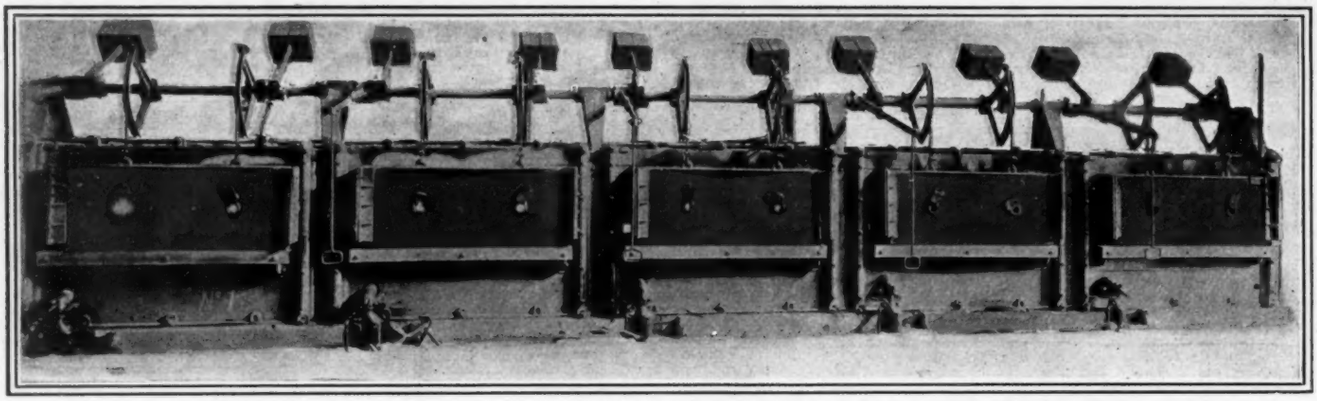


Fig. 1—View of the five new casehardening furnaces installed at Warner plant at Toledo

Equipment for Heat Treatment

CASEHARDENING and special heat treatments enter so widely into the field of making automobile parts that the Warner Manufacturing Company, of Toledo, Ohio, which makes steering, transmission and differential gears, has found it necessary to install a large new plant for this purpose. The equipment of this plant comprises five casehardening furnaces Fig. 1 which are arranged in battery form, and two heat-treating furnaces, and it was designed by Walter Macleod & Co., of Cincinnati, Ohio. Included in the plant are also a steel fan pressure blower, which is directly connected to a motor, a rotary oil pump geared to the blower shaft, and a Taylor multiple indicating pyrometer outfit. Furthermore the equipment includes a 13,000-gallon oil tank, pipes and gauges, and a motor for determining the fuel consumption.

In order to get the maximum amount of work out of the furnaces with the least expense involved, it is necessary to have this equipment designed in the most efficient fashion. All seven furnaces contained in this plant are made of high-class fire brick, encased in heavy sectional cast-iron ribbed plates which are held in their relative positions by means of bolting strips and tie rods. The combustion chamber, in each furnace, is located adjacent to the heating space and the construction of the former space is such as to permit of proper distribution of the gases carried to the heating-chamber arch, so that the charge is heated effectively, yet in a protected position. After heating the material the gases pass into flues in the walls.

Taking into account the tendency of hot gases to rise, the combustion chamber is so constructed as to permit the hot gases to fill it and then to escape, under a uniform pressure, through the ports to the heating chamber. The pockets leading thereto are fire-brick lined. The hearth is a solid foundation of common standard-shape fire brick. The fuel used being oil, an oil burner is stationed in front of the furnace parallel with the combustion chamber, while an auxiliary air blast enters on the opposite end. This blast is controlled by a valve directly under the burner.

In the casehardening furnaces, the heating chambers are each 54 by 72 inches, while in the heat-treating furnaces Fig. 2 they are 32 by 40 inches. The casehardening furnaces have, at 1560 degrees Fahrenheit, a capacity of 190 sets of transmission gears per day of 24 hours. Average penetration of hardening is 1-32 inch.

The variation in temperature in a combustion chamber is not more than 30 degrees Fahrenheit.

Oil and air used for heating are supplied by a unit Fig. 3, composed of a No. 8 A. B. C. steel fan pressure blower which is directly connected to a 15-horsepower electric motor by a flanged coupling.

The oil pump is constructed for the so-called suction-return system and is fitted with check and relief valve, pressure gauge and all other necessary accessories. The pyrometer outfit used is the product of the Taylor Instrument Companies.

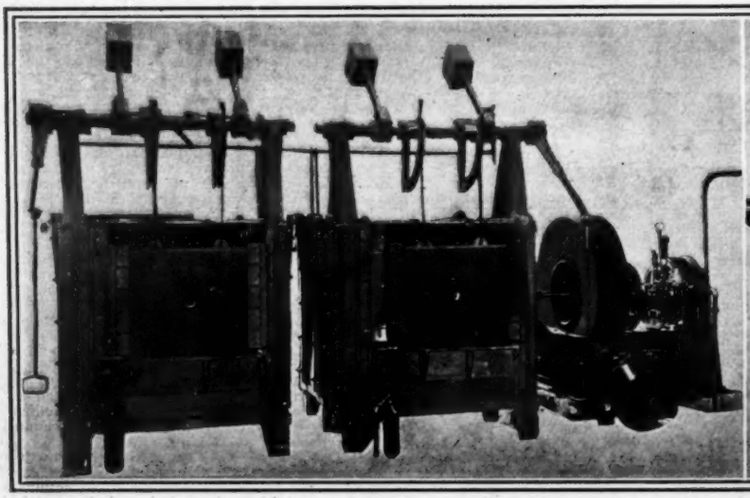


Fig. 2—Two heat-treating furnaces and motor operating them.

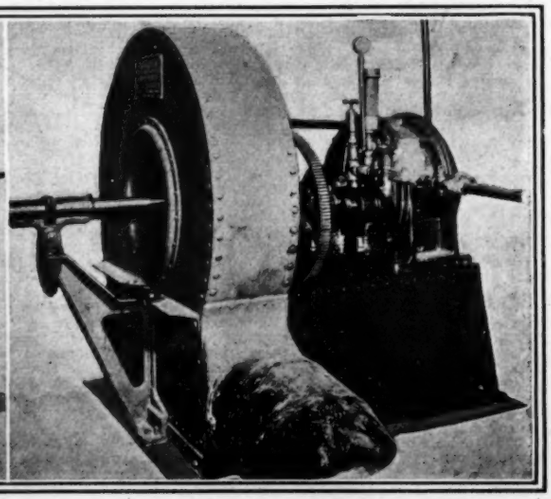


Fig. 3—Steel fan pressure blower and motor

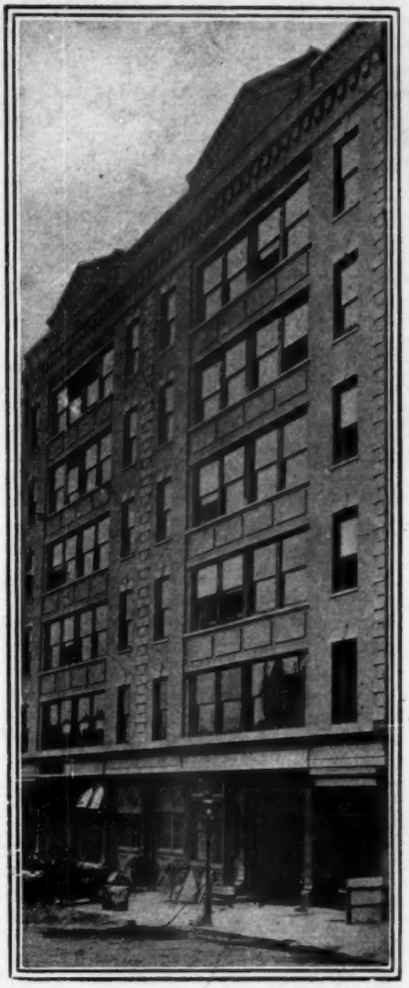
Service Buildings Open in New York

THE F. B. Stearns Company, of New York City, has just opened extensive quarters for the accommodation of its patrons, whose cars are in a state to be repaired. The rapid growth of the concern's business was the cause of the old repair department at 227 West 57th street proving too small for the increasing need, so that the company had to go to the construction of more spacious premises.

The new service department, which in its entirety is devoted to the repair and overhauling of Stearns products, is located at 415 West 55th street. The building, which is shown in the accompanying illustration, is six stories high, these lofts, in addition to a basement, being equipped in a most up-to-date manner in order to take care of the work that comes in. The space is about 40 x 100 on each floor, making a total of about 30,000 square feet.

On the ground floor is stationed the office, and here too the cars make their way to the elevators lifting them to the higher floors. The entrance from the street is wide enough to permit the heaviest trucks to enter. The second floor contains the stock room, with a complete stock of Stearns repair parts. This department takes up almost half of the floor, while the other half is used for overhauling purposes. The next higher floor houses the machine shop and the automobiles, while such repairs are executed upon them as necessitate the proximity of the shop. The other floors are used for storing and assembling work, as well as for general tuning-up work.

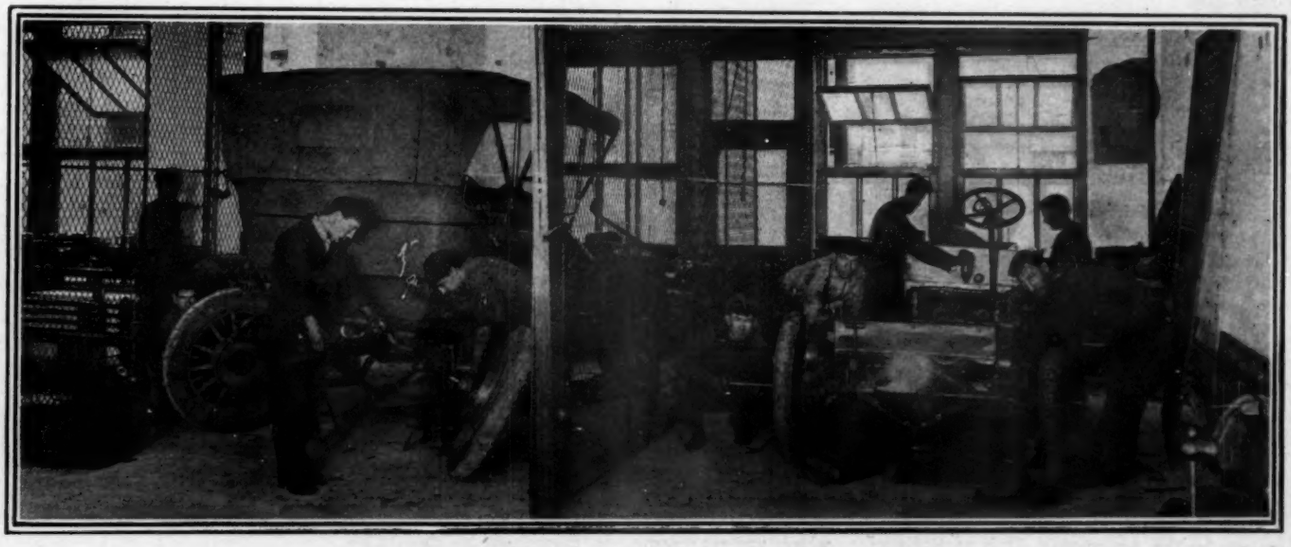
When some weeks ago the finishing touch had hardly been put on the building, the workmen of the company were already busy on the various machines in the building. The building had been opened but for two days and already there were about two dozen automobiles there, expecting speedy treatment. A corner of the third floor is shown, with two cars being worked on and part of the machine shop in sight.



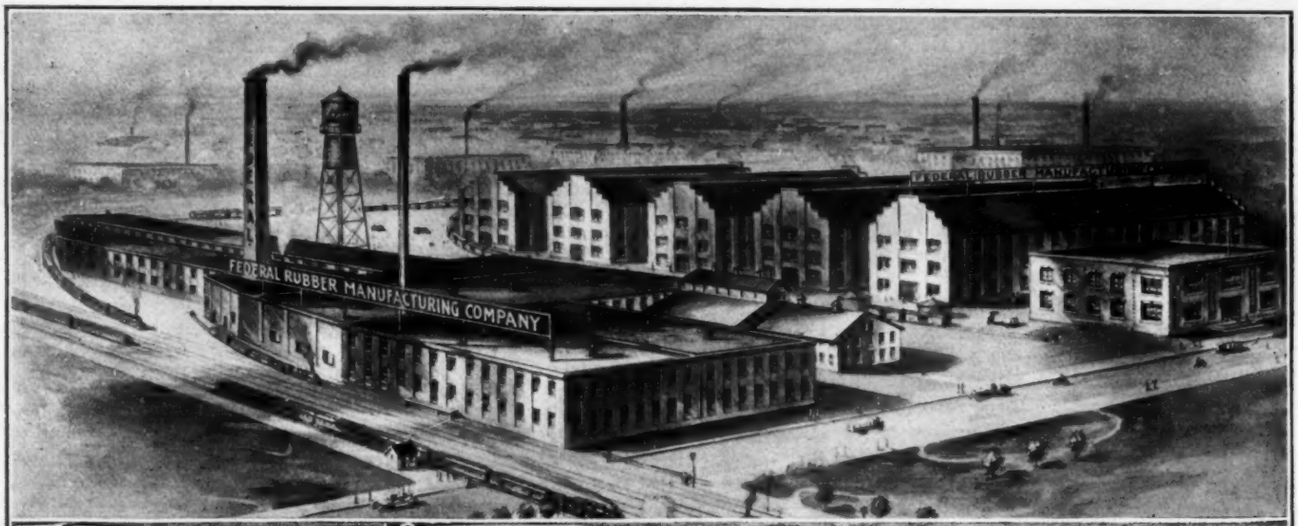
Beautiful new Stearns and Mitchell Buildings

Automobile companies find this neighborhood a most suitable one to install their service departments in, and it may safely be predicted that within a short time many concerns will follow the example set by Stearns and others. This is foretold by the fact that the Mitchell corporation has opened a service building adjacent to the Stearns department, which is seen on the left of the upright illustration. The space occupied by the Mitchell works is about the same as that used by the Stearns people. The New York home of the Saurer trucks is situated at the right of the Stearns building.

At foot West 57th street, the White Company is just finishing its new service department. This is a ground-floor affair, with no upper stories, but it has almost as much total area as the Stearns place, being 100 by 240 feet large. Like the other building, the White place is constructed of reinforced concrete. The lighting system demands special comment, in that plenty of light is available at every place in the building. This is accomplished, not by a full-glass roof, but by placing the roof surface at two levels and connecting these by huge vertical windows permitting lots of light to enter the interior. The White building also serves only as a service department, and no garage work is done in it.



The interior of the Stearns repair shop is spacious and adequately lighted



NEWS of the WEEK CONDENSED

Bird's-eye view of the new plant of the Federal Rubber Manufacturing Company at Cudahy, Wis.

CUDAHY, WIS.—Since the announcement by the Federal Rubber Manufacturing Company last July of its acquisition of the plant formerly operated by the Federal Rubber Company in this city, and of its purpose to enlarge and remodel the property throughout, this work, in charge of the Westinghouse-Church-Kerr Company, has been rushed night and day. The Federal plant is located on a five-acre tract on the main line of the Chicago & Northwestern Railroad. It is provided with ample switching facilities for the economic handling of its raw material and for the distribution of its finished products.

KIRBYVILLE, TEX.—M. Singletary of this city is to open a garage and machine shop.

SANFORD, ME.—The Ford Auto Co. has taken the agency for the 1912 line of Pullman cars.

LOWELL, MASS.—Frank E. Harris has taken the agency for the Oldsmobile in this vicinity.

TRENTON, N. J.—Harry Stout, 12 and 14 East State street, has added the Pullman car to his line of 1912 models.

SANDUSKY, O.—The Sandusky Auto Parts & Motor Truck Co. has increased its capital stock from $150,000 to $500,000.

NEW BRITAIN, CONN.—T. W. Crowe has been awarded the contract for the garage to be erected by the New Britain Gas Light Co.

MILWAUKEE, WIS.—The Goodyear Rubber & Tire Co. has established a branch at 134-136 Oneida street. H. P. Ziegler is manager.

PHILADELPHIA.—Settlement was made recently by the Automobile Club of Philadelphia for a site for a two-story clubhouse and garage.

MILWAUKEE, WIS.—Edwin J. Groth, 1125 25th street, has been appointed distributor of the Crown positive safety lock for motor cars in this territory.

HAMBURG, GERMANY.—The Ford Motor Co. of Detroit, Mich., U.S.A., has opened a branch in this city. The European trade of the company continues to expand.

SAN ANTONIO, TEX.—The Taxicab Co. of this city has changed its name to the Transfer & Taxicab Co., and has increased its capital stock from $15,000 to $30,000.

AKRON, O.—M. H. Pletcher will handle the Pullman 1912 line in Summit county. Mr. Pletcher will also establish a number of Pullman agencies throughout the state.

PITTSBURGH, PA.—Plans have been completed for a two-story brick and reinforced concrete garage and sales building to be constructed in the East End for the White Co. of Cleveland, O.

HARRISBURG, PA.—According to statistics announced this week by the Pennsylvania state highway department over 44,000 licenses have been issued by the automobile license division up to the present time.

GENEVA, N. Y.—The ferry across Cayuga Lake has been discontinued for the season, making it necessary to use the Montezuma Swamp road via Free Bridge. The road is in passable but dangerous condition.

PORT WASHINGTON, WIS.—The Kraus & Grau Hardware Co. has been appointed Ozaukee county agent for the Cutting, Westcott, Herreshoff and National lines, which are represented in Wisconsin by the Wisconsin Auto Sales Co., 114 Mason street, Milwaukee.

WYOMING, ILL.—E. H. Brown, Stark County agent for the Studebaker, E-M-F and Flanders cars, is planning extensive enlargements and improvements to his garage on Main street this winter. Mr. Brown has again contracted for the Studebaker lines for the coming season.

DETROIT, MICH.—R. E. Fair, manager of the Lion Motor Sales Co., has closed a contract with the Farmers' Handy Wagon Co. of Saginaw for 35 Lion 40s. The Saginaw concern has purchased the cars for the use of their salesmen, who will thus be able to cover their respective territory more thoroughly than by depending on trains and livery rigs.

DETROIT, MICH.—The Republic Rubber Co. of Michigan has been incorporated and will handle the full line of automobile and motor truck tires manufactured by the Republic Rubber Co. of Youngstown, O. The local salesroom and office will be located at No. 1001 Woodward avenue, with C. P. Foley, formerly with the local branch of the Firestone Tire & Rubber Co., in charge.

FREEPORT, ILL.—A. H. Kloepping & Co. have taken over the Bijou Garage on Douglass avenue and will handle the Studebaker lines in Stephenson County for 1912. While the main office of the new concern will be in Freeport, branches will be established in Orangeville, under the management of A. M. Snyder, at Rock City under the management of A. H. Kloepping, and the Freeport end will be handled by George Mitchell. Branches will also be established at German Valley and Pearl City.

CHETEK, WIS.—Harry E. Johnson has established a garage here.

RACINE, WIS.—The Racine Automobile & Motor Works will represent the Buick line in this territory.

AUGUSTA, WIS.—Julius Walthenpuhl has been appointed district agent for the Imperial and is now erecting a garage.

PORTLAND, ORE.—The Rose City Garage of Portland has taken the Oregon distribution of the Baker electric machines.

CINCINNATI, O.—The Eddy Auto Co. is erecting a $10,000 one-story concrete and brick automobile garage on May street.

SYRACUSE, N. Y.—The James Auto Co. will handle the Central New York territory for the Hudson Motor Car Co. of Detroit.

WAUSAU, WIS.—The L. H. Hall Co., agent for the Chalmers line for several years, has become exclusive agent for the KisselKar.

MONDOVI, WIS.—R. P. Goddard, Jr., has been appointed local agent for the Jackson, and has completed work on a new garage building.

LOUISVILLE, KY.—The Louisville Automobile Co., local agent for the Hupmobile, has acquired the agency for the Van Dyke trucks in this territory.

KEWASKUM, WIS. — The John W. Schaefer & Sons Co. is erecting a new garage here. The company will represent the Overland line in several counties.

SEATTLE, WASH.—Fred M. Powell has become identified with the Hugh A. Baird Co. of this city in the capacity of sales manager. The Baird Co. handles the Reo, Franklin and Apperson cars.

CINCINNATI, O.—C. H. Linson, manager of the Motor Car Supply Co. has severed his connection with that company and will go to Minneapolis, Minn., to act as branch agent for the Republic Tire Co.

SYRACUSE, N. Y.—The Velie Motor Vehicle Co., through the Kerr-Doane Motor Co. of this city, has established the following agencies for Velie cars: Norwich, Binghamton, Hornell, Elmira, and Ithaca.

MOBILE, ALA.—The Sowell Auto Co. will conduct the garage formerly operated by the McMain Motor Car Co. The Sowell Co. is composed of Walter Sowell and D. C. Sowell, formerly of Wallace, Ala., and Richland, Miss.

DETROIT, MICH.—A. J. Rousseau, who has been identified with the General Motors Co. for some time, has been appointed sales manager in charge of the western district for the Imperial Automobile Co. of Jackson, Mich.

LOUISVILLE, KY.—The business of the Ford Motor Co. of Detroit has been increasing so rapidly in Kentucky through their Louisville agent, the Banks Motor Car Co., that the factory established a permanent branch here this week.

NEW YORK CITY—George Armstrong, representing Carlos Armstrong, E. Hijos, Playa-Ponce, Porto Rico, on a recent trip to this city, arranged with the Colt-Stratton Co., Cole eastern distributor, to handle the Cole car in Porto Rico.

WHITE SALMON, WASH.—A new bridge is to be built over the river near here to accommodate the heavy loads which will be hauled by 5-ton automobile trucks used in transporting material for the construction of the new concrete dam.

NEW YORK CITY.—The Motor Car Equipment Co. is opening an uptown branch in addition to its main headquarters at 55 Warren street. The branch is located at 238-40 West 56th street, and will be ready for business about the December 10.

NEW YORK CITY.—The American Express Co. has a fleet of fifteen Packard 3-ton trucks in service in this city. After several years of experiment the company has found that the automobiles are cheaper and more efficient than horses in delivery work.

OMAHA, NEB.—S. A. Zapp and J. F. Lohrmann of Fremont have contracted with the Racine Sauley Co. to handle the Nyberg and Columbus cars in their territory. The Casey Auto Co. of Casey, Ia., will also handle the Nyberg cars.

SYRACUSE, N. Y.—F. R. Bump, who was formerly general sales manager of the H. H. Franklin Mfg. Co. of this city has become assistant general manager of the R. C. Hupp organization. Mr. Bump has recently been with the Universal Motor Truck Co.

TOLEDO, O.—A new concern has been organized in Toledo to be known as the Ignition Starter Co. It has quarters in the Nicholas building. H. A. Cavanaugh and J. M. Ewing are the promoters of the business. They will equip cars with the Disco self-starter.

KENOSHA, WIS.—Richard H. Welles is at the head of the company which intends to provide the city of Kenosha with motor bus service. Mr. Welles states that the service will be inaugurated about December 1. The service will extend over the entire city, along regular routes, and will be operated winter and summer.

MILWAUKEE, WIS.—Recent agency appointments by the Hickman-Lauson-Diener Co., Milwaukee, state agent for the Ford, include: Marathon Motor Car Co., Wausau; Arthur Voss, Mukwanago; G. H. Hafemeister, Watertown; August Prange, Sheboygan; F. C. Behlendorf, Oshkosh; T. W. Twining, Gays Mills; John Hieligenthal, Lyons.

CINCINNATI, O.—Ira D. Cooper, formerly with the Morgan & Wright Tire Co., has left that organization and formed the Cooper Rubber Co., with the aim of distributing tires throughout Ohio, Indiana, Kentucky, and West Virginia. The new company will also handle its own line of bicycle, buggy, vehicle and solid motor tires. J. R. Burgamy, late of the Coughlin & Davis Co., has associated himself with the new firm.

INDIANAPOLIS, IND.—George Lehnert has been appointed receiver for the Star Motor Car Co. of this city by Judge Collier of the Superior Court. Action asking the appointment of a receiver was brought by Theodore M. Weiss, a stockholder, who alleges the concern is insolvent. The company was organized and incorporated in November, 1909, for the purpose of manufacturing motor cars but has never built but one car. Offices have been maintained in the Lemcke building.

Packard 3-ton trucks in the service of the American Express Company in New York City

President G. A. Matthews, of the Jackson Automobile Co., in his new coupé

HAGERSTOWN, MD.—R. Bruce Carson has taken the local agency for the Cole car.

KEWANEE, ILL.—The Kewanee Garage has been appointed agent for the Cole car.

FOND DU LAC, WIS.—The Auto Tire & Repair Co. has been appointed agent for the Rambler line.

MOSCOW, IA.—The Moscow Automobile Co. has been organized here to distribute the Cole car in this vicinity.

SAN FRANCISCO, CAL.—F. W. Burgers, formerly connected with the Phoenix Rubber Co., will hereafter handle the Batavia tire in this territory.

MILWAUKEE, WIS.—Bonow Bros. have taken over the Boulevard Garage at 266-268-270 Twenty-sixth street and will handle the Nyberg line of cars in Milwaukee county.

PORTLAND, ORE.—Showing the rapid increase in the number of automobiles now in Oregon, the total number of automobiles in this state in July, 1909, was 2100. Now there are over 6500.

RACINE, WIS.—Amended articles of the Mitchell-Lewis Motor Co. were filed with the register of deeds recently. Amendments provide for sixteen directors instead of ten as heretofore.

SYRACUSE, N. Y.—Representatives of the Knox, Rambler, White and Premier automobiles, which now have no agencies in the city, are now here, and it is stated that agencies will be established in a few days.

DETROIT, MICH.—The Detroit Public Library has established a branch at the factory of the Packard Motor Car Co. This step was taken in consideration of the fact that more than 7,000 persons are employed there.

JACKSON, MICH.—The Jackson Automobile Company has brought out a new model. It is a 40-horsepower coupé with 118-inch wheelbase and 34-inch wheels. The car, which is electrically lighted throughout, has the steering wheel on the left and the control levers in the center.

MOLINE, ILL.—The Midland Motor Co. of this city, manufacturers of the Midland car, recently appointed the following new agents: Lewis Sales Co., 3950 Olive street, St. Louis, Mo.; Carrigan Bros., 1006 Olive street, Los Angeles, Cal.; Wm. Easton & Son, Austin, Nev.; Farmers' Exchange & Implement Co., Price, Utah.

GALESBURG, ILL.—Callender & Petrie will handle the Rambler line in this vicinity, with headquarters in Galesburg and a subbranch in Ophiem. A new garage and salesroom is now being fitted up for them on Prairie street, which will be modern in every respect and ready for occupancy in a short time.

SYRACUSE, N. Y.—The following have been recently appointed agents for the Franklin car: Woodhouse-Lough Co., Plainfield, N. J.; W. A. Worley, Jacksonville, Fla.; C. G. Meyer & Son, Tiffin, Ohio; Fruit-Ohl Co., Sharon, Pa.; Barber & Hunter, North Adams, Mass., and H. B. Sproul & Co., Staunton, Va.

SYRACUSE, N. Y.— Julian Brown, son of the prominent manufacturer, A. T. Brown, of this city, announces that he will soon erect a factory for manufacturing the gas engine recently invented by him and which is attracting a great deal of attention in the trade. Mr. Brown will have plenty of financial backing. The factory site is not yet selected.

NEW YORK CITY.—In referring to the increase of the capital stock of the Thomas Motor Cab Co., of Buffalo, N. Y., from $50,000 to $100,000 in our issue of November 16 an unfortunate typographical error made it appear that the company in question was the Thomas Motor Car Co. of that city. As is well known, the capital of this company is $2,400,000.

BOSTON, MASS.—The Franklin Co. has decided to give up its branch in Boston and hereafter it will be conducted as an agency. O. A. Lawton, who for some time has been manager of the branch, has decided to take the Franklin on as an agency proposition, and for the present he will have his salesrooms at 31 Irvington street. He has the New England territory.

MARINETTE, WIS.—The United Car & Sales Co. has been organized here by Myron Churchill and Harold Scott, to do a general agency and garage business at 1351 Main street. The concern will represent the Buick and KisselKar lines. Alex Nordquist will be in charge of the garage and shops. Messrs. Churchill and Scott recently established the Marinette School of Motoring here.

DETROIT, MICH.—A. F. Mais, recently vice-president and chief engineer of the Mais Motor Truck Co. of Indianapolis, has resigned as chief engineer of the Mais company and accepted a position as consulting engineer for the Studebaker Corporation, E-M-F company. The old Ford plant located near the E-M-F factory in Detroit has been absorbed by the Studebaker corporation and converted into an experimental department. Mais is in charge of this department, which is known as plant No. 10. His office as vice-president of the Mais Motor Truck Co. is still retained together with his interest in the concern.

MILWAUKEE, WIS.—Efforts are being made by garage-keepers in Wisconsin to arrive at a uniform scale of rates for storage, washing and polishing. The accepted schedule is as follows: Two to five-passenger cars: storage, 50 cents; per month, $15.00; washing, $1.00; polishing, 50 cents. Seven-passenger cars: storage per day, 75 cents; per month, $20.00; washing, $1.50; polishing, 50 cents. Limousines: storage per day, 75 cents; per month, $20.00; washing, $2.00; polishing, 50 cents; use of wash-rack, $1.00. Electric pleasure cars, per day, $1.50; per month, including washing, polishing and charging, $32.50. A uniform scale of prices for gas and oils is also to be made.

GALESBURG, ILL.—Hobbie & Martin, who for the past three years have been associated in the general garage business and as territory distributors for the Buick line for the surrounding counties, have dissolved partnership. The Buick line will be carried by W. C. Hobbie, who will have practically the same territory, while W. P. Martin, as manager and owner, will retain the garage located on Seminary avenue. Mr. Hobbie will open a salesroom in the business district with a small garage in connection. George Sperry, who has been with Mr. Hobbie for the past two years, will become his partner, and will take up the sale of Buick cars in Knox, Henry, Warren, and Mercer counties.

YORK, PA.—The Townsend Auto Co. of Easton, Md., has taken the agency for the 1912 line of Pullman cars.

SAO PAULO, BRAZIL.—S. Kremer Sobrinho has become the agent for the Pullman cars in this country.

AKRON, O.—The Cuyahoga Realty Co. will erect a $17,000 garage and storage room at 41-45 North High street.

WOODBINE, IA.—F. C. McCann has secured the agency for the Nyberg car from the Racine-Sattley company of Omaha.

DULUTH, MINN.—W. J. Gorgon is now associated with the Interstate Automobile Co. as a member of the sales force.

BALTIMORE, MD.—James M. Easter is having plans prepared for a garage which he intends to erect at 2100 Eutaw Place.

JACKSONVILLE, FLA.—W. C. Thomas, of the Jacksonville Regal Motor Agency, has secured the agency for Florida for the Haynes car.

GLOUCESTER, MASS.—Perkins & Corliss, the local garage owners, have recently taken the agency for the Ford in this city, Manchester, Essex and Rockport.

NEW YORK CITY—The American Rim Co. has taken quarters at 250 West Fifty-fourth street, where it will handle the Lambert demountable and quick detachable rim.

CHICAGO, ILL.—N. Lazarnick, of New York City, the pioneer automobile photographer, has opened a branch office and studio at 509 South Dearborn street, in this city.

WALTHAM, MASS.—The Motors Specialties Company of this city has discontinued its Boston office and has removed it to the factory where all departments will be under one roof.

BOSTON, MASS.—Hugh Miller has been made resident manager of the Aristos Co., distributors of the Disc-Self-Starter, with offices and salesrooms at 1002 Boylston street.

LOS ANGELES, CAL.—Mr. Gehricke has been appointed manager of the local branch of the Stromberg Motor Devices Co., of Chicago, Ill., at 945-947 South Main street.

DEFIANCE, O.—Edward and John Compo have purchased the large business of the Miller Machine Co. The garage will be conducted in the future under the firm name of Compo Bros. Garage.

BOSTON, MASS.—The Velie Boston Branch is to remain in its present headquarters at 92 Massachusetts avenue throughout the 1912 season, the report that a removal was contemplated being incorrect.

PHILADELPHIA, PA.—At the annual meeting of the Quaker City Motor Club, to be held early in December at the Hotel Walton, Clarence Cranmer will be appointed to the secretaryship, vice A. T. James, resigned.

New salesrooms of the Waverley and Elmore agents at Detroit, Mich.

BOSTON, MASS.—Manager Chester I. Campbell, of the Boston Automobile Show, with Mrs. Campbell, sailed last week for a trip to Europe where he will look over the foreign shows and compare them with the American ones.

PORTLAND, ME.—G. A. Blanchard has taken on the Selden car for this section of Maine, the agency having been closed a few days ago by John D. Murphy, eastern traveling representative of the Selden company, who is now touring the New England states.

BOSTON, MASS.—W. H. Vinal, who organized the Motor Car Co. of Boston and was president of the corporation, has resigned and disposed of his stock to S. S. Anderson. The Motor Car Co. has the New England agency for the Nance six. Mr. Vinal has not made any plans for the immediate future, but he expects to embark in the motor industry later on with a combined pleasure and commercial line. L. W. Abbott has been made sales manager of the company.

Automobile Incorporations

AUTOMOBILES AND PARTS

BOSTON, MASS.—Fothergill Motor Co.; capital, $100,000; to sell and make freight automobiles. Incorporators: R. B. Skinner, A. C. York.

CHARLESTON, OHIO.—Collison-Pierson & Co.; capital, $25,000; to buy and sell automobiles. Incorporators: J. F. Collison, D. R. Pierson, W. S. Taylor, O. H. Ashley, A. B. Koontz.

CHICAGO, ILL.—Harder Autotruck Co.; capital, $100,000; to manufacture motor trucks. Incorporators: Henry P. Chandler, J. M. Johnson, K. Cornwall.

DALLAS, TEX.—Oldsmobile Co.; capital, $10,000; to sell automobiles. Incorporators: Rupert E. Paris, R. N. Mosher, Clinton C. Clark.

DUBUQUE, IA.—Dubuque-Rambler Auto & Supply Co.; capital, $20,000; to sell automobiles and accessories. Incorporators: Arch Frater, B. M. Fitzgerald, W. E. Ellwanger.

INDIANAPOLIS, IND.—Pedalmobile Mfg. Co.; capital, $2,500; to manufacture automobiles. Incorporators: Geo. Herff, J. F. Minthorne, A. T. Purcell, P. A. Porteous.

LOUISVILLE, KY.—Transit Motor Car Co.; capital, $20,000; to manufacture and repair automobiles. Incorporators: E. C. Walker, Geo. H. Laib, W. B. Young.

MEMPHIS, TENN.—Tri-State Auto Co.; capital, $1,000; to sell automobiles. Incorporators: J. F. Hignan, R. L. White.

NEWARK, N. J.—Lenox Motor Car Co.; capital, $25,000; to sell automobiles. Incorporator: Louis Lippman.

NORFOLK, VA.—Virginia Automobile & Repair Corporation; capital, $10,000; to sell and repair motor cars. Incorporator: H. L. Page.

TOLEDO, OHIO.—Royal Auto Co.; capital, $1,000; to sell automobiles and equipment. Incorporators: Marion H. Kennedy, E. B. Parker, B. C. Christen, E. J. Heise, E. M. Warnke.

TOLEDO, OHIO.—Moore Motor Truck Co.; capital, $10,000; to build and deal in motor trucks. Incorporators: D. W. Bliss, E. L. Skidmore, C. H. Rauch, E. F. Moore.

URBANA, ILL.—Illinois Motor Car Sales Co.; capital increased from $12,000 to $25,000.

AUTOMOBILE GARAGES, ACCESSORIES, ETC.

BUFFALO, N. Y.—Herkimer Garage Co.; capital, $10,000; to conduct a general garage business. Incorporators: Rowland J. Conover, Robert E. Conover, Louis K. Jillson.

CARROLLTON, OHIO.—Carrollton Rubber Co.; capital, $10,000; to deal in crude rubber and rubber goods. Incorporators: Homer J. Richards, John H. Richards, J. R. Williams, James C. Oglsvee, Wm. H. Miller.

CHICAGO, ILL.—Empire Top & Supply Co.; capital, $20,000; to manufacture automobile equipment. Incorporators: Henry Graff, Jr.; Albert N. Charles, Joel E. Bullard.

CINCINNATI OHIO.—Auto Accessories Mfg. Co.; capital, $15,000; to make automobile accessories. Incorporators: S. C. Roettinger and others.

FORT WAYNE, IND.—Merchants Motor Delivery Co.; capital, $25,000; to conduct a transfer business. Incorporators: A. W. Harris, W. Han, A. H. Fernwalt.

INDIANAPOLIS, IND.—Co-Operative Automobile Supply Co.; capital, $25,000; to deal in supplies. Incorporators: B. H. Rifenbark, J. C. Curtis, J. H. Boesinger.

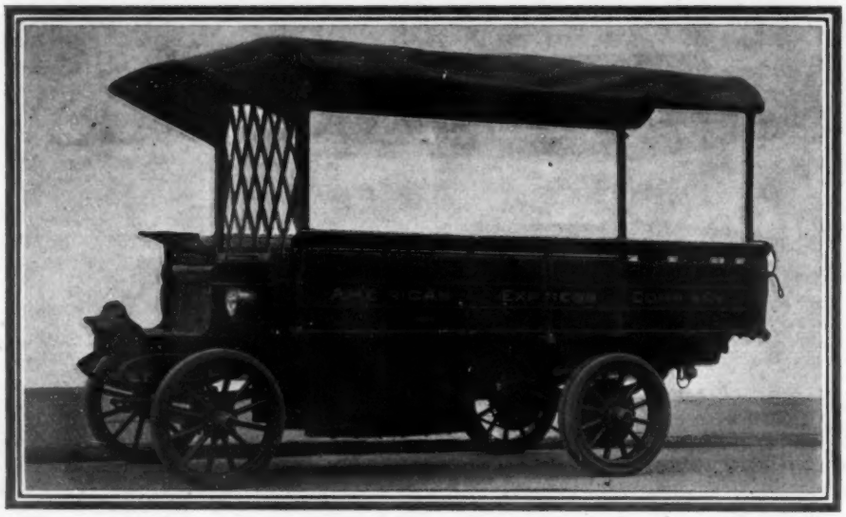
PITTSFIELD, MASS.—Pittsfield Auto Garage Co.; capital, $3,000; to operate a garage. Incorporators: Mary I. Mills, Arthur A. Mills, Arthur J. Mills.

PUNXSUTAWNEY, PA.—Cole Automobile & Transfer Co.; capital, $10,000; to do a general transfer business.

ST. LOUIS, MO.—Curtis Jack & Trust Co.; capital, $75,000; to manufacture combination jacks and hand trucks. Incorporators: J. R. Curtis, H. C. Flunker, A. W. Smith.

WASHINGTON, PA.—American Tire & Filler Co.; capital, $200,000; to manufacture and sell automobiles. Incorporators: Jas. S. Forsythe, F. C. Lewis, H. J. Johns, R. D. Forsythe, E. W. Rolfe.

OF INTEREST to the INDUSTRY



One of the fifty Baker electric trucks ordered by the American Express Company

CLEVELAND, OHIO.—An order for fifty electric trucks has been placed by the American Express Company with the Baker Motor Vehicle Company, of this city. For several years the express company has been experimenting with delivery systems using both horses and motor vehicles with the result that the motor-truck system has been found the more satisfactory.

TULSA, OKLA.—Tulsa's first automobile factory will be turning out cars by January 1. The factory is that of the Dowagiac Motor Car Company, of Dowagiac, Mich.

SCHENECTADY, N. Y.—The Nordyke & Marmon Company, of Indianapolis, Ind., has ordered eighty-two induction motors of the General Electric Company, of this city.

DETROIT, MICH.—The Krit Motor Car Co. has just shipped fifty cars to Great Britain and twenty-three to other foreign countries. The company is devoting more attention to its export trade than formerly.

TOLEDO, OHIO—Machinery is being installed at the new plant of the Electric Auto-Lite Company in the rear of the offices at 135-137 Michigan street. Officers are A. W. Fisher, president; S. L. Kelly, vice-president, and C. Q. Miniger.

FINDLAY, O.—The Universal Machine Company is removing from Toledo to Bowling Green. The new factory has a floor space of 22,000 feet and will be used for the manufacture of the Toledo marine engine. By the first of the year the company expects to manufacture parts for the Modern Motor Car Company.

LA PORTE, IND.—The establishment of a factory to manufacture radiators for plowing engines and possibly automobiles in this city is practically a certainty, and it is expected to erect a factory building this fall. E. H. Scott and Dr. Edward A. Rumely are largely interested in the project.

DETROIT, MICH.—The Anderson Electric Car Co. shipped its first trainload of Detroit Electrics from the factory recently. The company has many orders ahead and is running full time. Ten models are being manufactured this year, one of the latest being a roadster with a 96-inch wheel base, a wheel steer and a control device on the wheel.

NORWALK, O.—The affairs of the bankrupt Norwalk Motor Car Company are rapidly being wound up by Trustee A. J. Schur before Referee in Bankruptcy Benjamin B. Wickham. Recently a sale of the remaining assets of the company was made to the Model Gas Engine Company, of Peru, Ind., the largest individual creditor, the account being something over $5,000.

DETROIT, MICH.—The recently organized Chevrolet Motor Car Co., which has started clearing ground out Woodward avenue for a large plant, has elected officers as follows: President, William H. Little, of Flint, Mich., formerly general manager of the Buick plant; vice-president and treasurer, Dr. E. R. Campbell; secretary, Curtis R. Hathaway; designer and consulting engineer, Louis Chevrolet; assistant secretary and treasurer, W. W. Murphy. The company will manufacture the Chevrolet Six.

DETROIT, MICH.—Contracts were let recently for a large addition to the Scripps Motor Car Co.'s plant on Clinton street and work is already under way. Work is also about to start on the Hupp Motor Car Co.'s new plant at Milwaukee and Mt. Elliott avenues. The plans have been prepared by architects Dunlap and Palmer and the contracts let. Thus the company will have new factories going up on both sides of the river at the same time, ground having been broken for its Canadian branch in Windsor, Ont., some time ago.

INDIANAPOLIS, IND.—The Motor Starting Company has been organized here to manufacture a self-starting device. Quarters have been taken at 427 North Meridian street and factory arangements are to be made immediately. The device consists of a hand air-pump and small carbureter located on the floor near the driver's seat, with a tube running to each cylinder head. A mixture, consisting of one drop of gasoline to sixty-five parts air, is pumped into the cylinders and a spark causes sufficient combustion to start the motor. Lew W. Cooper is president.

DETROIT, MICH.—The pay-rolls of the Packard Motor Car Co. for the month of August, 1911, amounted to $524,407, probably the largest sum ever paid in wages by any one automobile factory in a single month. At that time there were 7,575 employes at work in the Packard shops. Five buildings were under construction to provide additions to the present floor space of 33 acres. This pay-roll of the company has increased to the enormous figures shown above from $16,278 in August, 1894, and for the fiscal year of 1903 and 1904 the pay-roll was less than for the month of August, 1911. The fiscal years of 1910 and 1911 showed a pay-roll amounting to $443,152.

DETROIT, MICH.—Honors are about even between the Herreshoff Motor Car Co. and the citizens who have been fighting the company in the courts, in an effort to prevent the establishment of a motor car plant in a fashionable section of Woodward avenue. In the Recorder's court last Thursday Judge Connolly denied a motion made by the company's attorneys to quash the condemnation proceedings instituted by the citizens interested. In the Wayne Circuit court the following day Judge Donovan refused to issue an injunction restraining the building operations, which at no time have been suspended since they were begun several months ago. The factory is now well along and the probabilities are that operations will have started by the time the condemnation proceedings are heard. It is almost certain that the case will go to the Supreme court for final adjustment.

PATENTS GONE TO ISSUE

CARBURETER—Gasoline vaporizer of the single-chamber type.

2. This carbureter has a casing (Fig. 1) which is open at the top and has a lateral discharge opening near the upper end and a gasoline inlet near the lower end, where also a number of openings are provided. Near its upper end the casing is enlarged to form an annular extension into which the outlet merges. A valve is provided for the inlet with a perforated disc connected to it, and an annular screen in the housing, which forms the inner wall of the extension, has inwardly directed lips. A closure for the upper end of the casing engages upon the lips mentioned and holds the screen in position.

No. 1,009,252—to Michael E. Mallo, Greeley, Colo. Granted November 21, 1911; filed November 26, 1910.

CLUTCH—Of the multiple-disc type directly connected to the transmission.

2. The patent covers the combination with a variable-speed transmission gearset of a clutch casing detachably secured to the front of the gearbox and supported by the same. A clutch shaft stepped at its rear end in the end of the transmission shaft and at its front end in a bearing in front of the clutch casing has universal joint secured to its front end, a multiple-disc mechanism inside the clutch casing connecting transmission shaft and clutch shaft. Means are provided on the clutch casing for operating the multiple-disc friction mechanism within the casing.

No. 1,009,702—to John G. Utz, Detroit, Mich. Granted November 21, 1911; filed November 22, 1910.

AUTOMOBILE WHEEL—In which rocking members and an elastic medium take the place and office of compressed air used in a pneumatic tire.

1. This wheel includes a rim on which a series of annular members is mounted which may rock independently of their relation to the rim. The terminal portion of each member fits snugly between the terminal portions of the adjoining members and movable relative to them. The terminal portions are connected by elastic means controlling the movement of the members, and they support a tread.

No. 1,009,088—to Charles S. Myers, Columbia, Pa. Granted November 21, 1911; filed September 27, 1910.

SHOCK ABSORBER—Friction between contacting discs is used to absorb shocks caused by road inequalities.

4. This patent relates to a shock absorber (Fig. 2) in which a rotary shaft is mounted inside a case and projecting from it to the outside. On the shaft, within the case, a packing gland is mounted, and a disc is also mounted on the shaft. Loose friction plates are provided on each side of the disc. A screw cap is provided for the case, and an annular spring is placed between one of the friction plates and the screw caps.

No. 1,009,454—to Harry C. Turner, Los Angeles, Cal. Granted November 21, 1911; filed August 21, 1907.

STARTING VALVE—A device for starting internal combustion engines without mechanical effort.

1. In this device (Fig. 3) a valve is located in a valve casing and its stem extends through a guide way, being operated by the engine, while the valve admits compressed air from a supply pipe through a conduit to a second valve parallel to the first. From the second valve the compressed air is admitted behind the engine piston to start the same, the first valve being automatically thrown open and out of operation when the air is cut off from communication therewith.

No. 1,009,626—to Baxter M. Alakson, Salem, O. Granted November 21, 1911; filed October 14, 1907.

DEMOUNTABLE RIM—A number of male and female inequalities in rim and felloe serve to insure engagement of the latter.

3. The patent covers a demountable rim and wheel structure comprising a coned wheel felloe embraced by a frustro-conical band, and a cylindrical wheel rim provided with depressions which carry a removable pneumatic tire sliding over the larger base of the frustro-cone. A wedge ring is secured to the inner front face of the rim and bears against the felloe band to close the open joint betwen rim and felloe. Outwardly projecting screws in the felloe engage with the rim depressions, thus keeping the rim in place on the wheel.

No. 1,009,103—to Robert P. Scott, Cadiz, Ohio. Granted November 21, 1911; filed June 15, 1909.

TRANSMISSION MECHANISM—Shaft drive combined with a live rear axle.

2. This mechanism comprises two rotary power transmitting wheels, a wheel fixed longitudinally and laterally with respect to one of the power transmitting wheels, and removable means for fixing the same to the other power transmitting wheel.

No. 1,009,435—to Ralph L. Morgan, Worcester, Mass.

SPARK PLUG.—Containing electrodes for both high- and low-tension currents.

1. The igniter covered by this patent comprises a hollow bushing carrying a low-tension electrode, which supports a high-tension electrode separated from it.

No. 1,008,178—Carl Messersehmid, New York, N. Y., assignor to The Duplex Magneto & Spark Plug Co., Brooklyn, N. Y. Granted November 7, 1911; filed January 6, 1911.

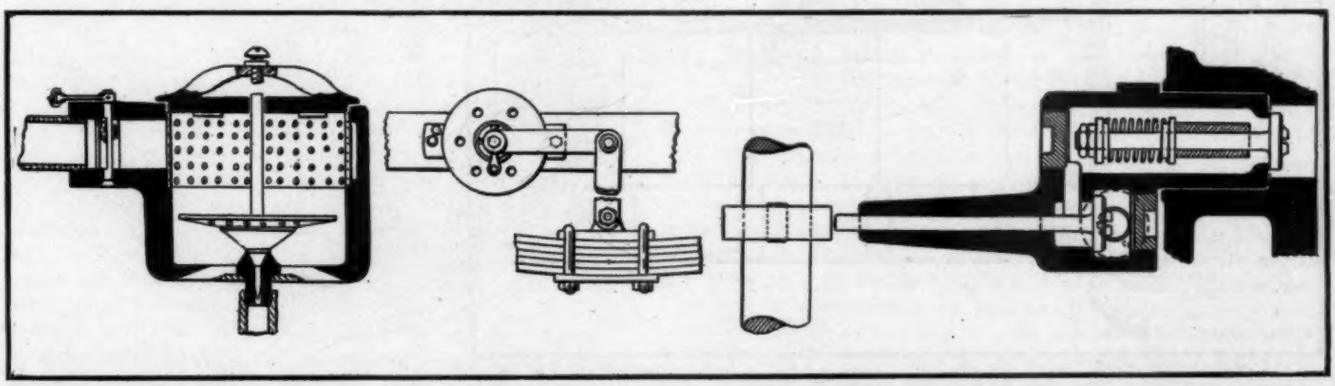


Fig. 1—Mallo carbureter. Fig. 2—Turner shock absorber. Fig. 3—Alakson starting valve

Newest Ideas Among the Accessories

Jacobson Air Compressor

THE Jacobson air compressor, Fig. 1, is of the garage type built by the Jacobson Machine Mfg. Co., of Warren, Pa. It is designed with the object of meeting the specific need of automobile owner or garage operator, by a combination of maximum capacity with minimum volume and weight. As Fig. 1 shows, this type has a cylinder which is air-cooled and cast in one piece with the bearing housing. The bore of the cylinder is 3 inches and the stroke 4 inches, and 200 revolutions of the crank are equivalent to 3½ cubic feet of air delivered by the compressor. The piston, which has three expansion rings, is of the trunk pattern, and the valves are made of a special grade of bronze. The bearings are made adjustable so as to overcome the effects of wear, and all parts are made in standard dimensions for the sake of interchangeability. The flywheel by which the engine may be driven is crowned for this purpose, but a small driving pulley may be procured with the machine, if this type of drive is preferred to the one by the flywheel. The weight of the machine is 200 pounds and the total floor space occupied by it 20 by 24 feet.

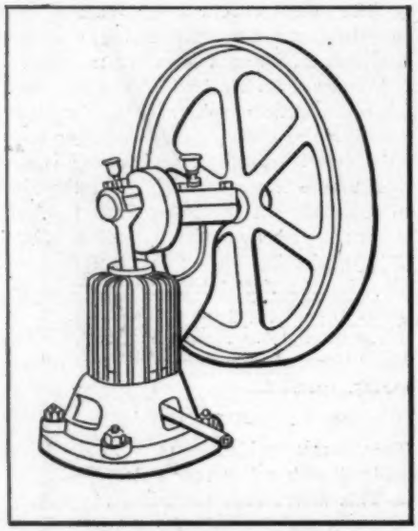


Fig. 1.—Jacobson air compressor

Federal Auto Washer

The Federal Auto Washer is shown installed in a garage in Fig. 3. The advantages of this system are that it is attached to the ceiling and, while it has a considerable range of action, will not be found to be in anyone's way in the garage. The top piece is held to the ceiling by four screws, and from it is suspended by a supporting arm and an elbow, a horizontal pipe, 4 feet 4 inches in length. This pipe may be turned in any direction, being connected to the top portion, into which the pipe from the water main leads, by a connection of standard dimensions. A rubber hose is attached to the end of the vertical pipe, and the other end of the hose carries a nozzle by means of which a stream of water may be directed against the body of the car. The flow of the water is regulated by a gate valve interposed at the wall in the branch of the water mains supplying the water, but it is also possible to use a nozzle with another valve permitting of the operator's starting and stopping the water while standing by the car. This washer is manufactured by the Walworth Mfg. Co., 132 Federal street, Boston, Mass., which is also acting as distributor and selling agent for the New England States.

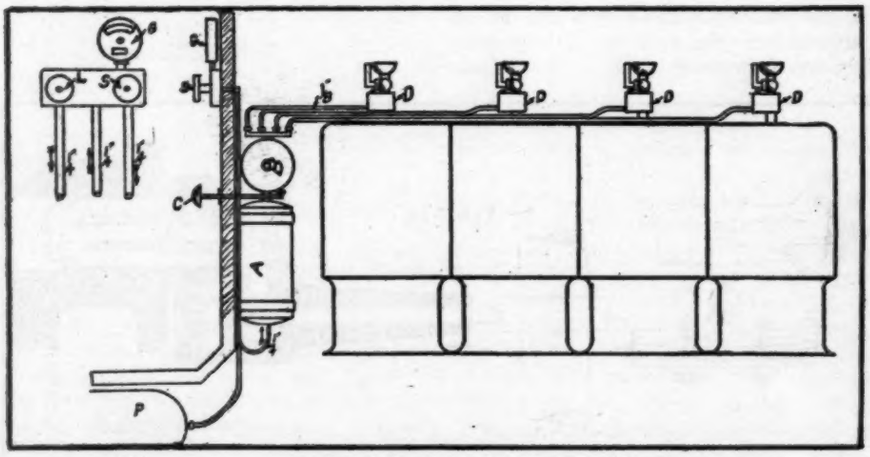


Fig. 2.—American self-starter system

American Self-Starter

The American Self-Starter is one of the systems in which acetylene derived from the gas tank is used to start the automobile engine on the spark. The system is installed in the manner illustrated in Fig. 2. The pressure tank A is installed on the front of the dashboard and securely fastened thereto. The push rod C extending from it should be in a position easily reached by the driver's foot. Then the priming cups are removed from the cylinders and the check valves D inserted in their places, and the controller with valves L for regulating the lights, and S for admitting gas to the starter is installed upon the dashboard. Valve L is connected with the lamps and S with the check valves in the cylinder heads, and connection is also made between gas tank P and needle valve B of the pressure tank A. For the latter purpose the maker of the starter supplies ⅛-inch brass tubes and patent lead packing for all joints and unions. Metal clasps are used to tie the tubes together to prevent rattling. For starting G the controller valve S is turned by its handle until the gauge above the controller registers 30 pounds pressure in the pressure tank; then the push rod C is pressed, releasing the compressed gas from the tank and directing it into one or two of the cylinders, whereupon the spark is thrown on. This process, it is claimed, will start the engine in any weather. The American Self-Starter system is handled in the New England States by the New England Sales & Equipment Co., 100 Boylston street, Boston.

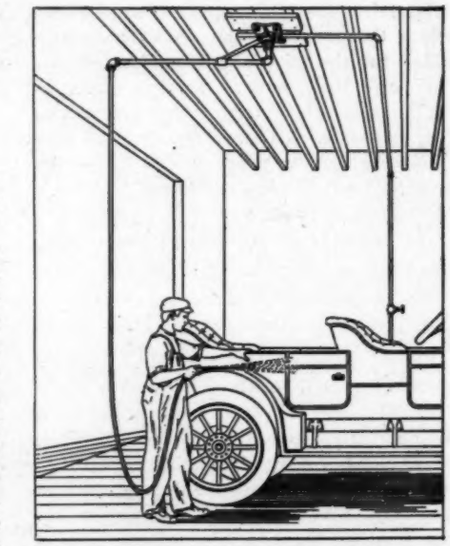


Fig. 3.—Federal Auto Washer